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Decision making methodology : test of logic and first field test.

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DECISION MAKING METHODOLOGY:

TEST OF LOGIC AND FIRST FIELD TEST

A Dissertation Presented

By

THOMAS M. HEFFERNAN

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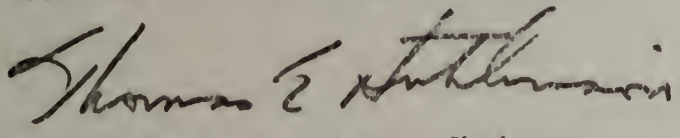

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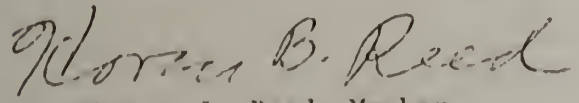

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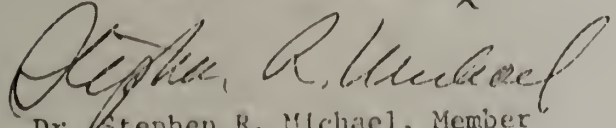

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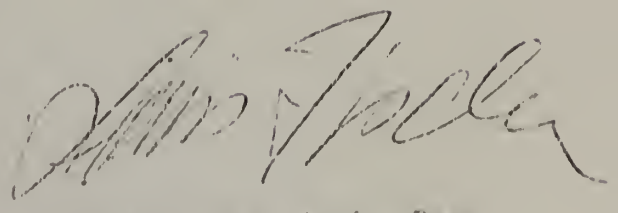

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I acknowledge all those who have shown me strengths and weaknesses that I can no longer avoid.

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(February, 1976)

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ABSTRACT

Decision Making Methodology is a reasonably operational process for decision making. This study examined a version of the Methodology that was designed for use in situations where a decision maker has a large amount of resources for making decisions in a particular problem area. A large amount of resources has only been operationally defined with respect to the resource of time. Amounts of time greater than twenty five hours are considered to be large amounts of that resource.

The purpose of this study was to identify problems in the Methodology. When the author decided that a particular problem was critical to the effectiveness of the Methodology that problem was solved through the design of new procedures.

A detailed description of the study is presented in the chapters of this document. Chapter One compares the Methodology to current

decision making theory. This chapter also relates the Methodology to some of the decision making strategies presently being used. Chapter Two describes the procedures of Decision Making Methodology. Chapter Three presents the design of the study.

This study was carried out in two phases. In phase one, the logic of the Methodology was analyzed. In phase two, the Methodology was field tested in an uncomplicated situation. Chapter Four reports the results of the logical analysis. Chapter Five reports the results of the field test.

Four critical problems were encountered during the course of the logical analysis. Two of these problems involved the incompleteness of specific sections of the Methodology. The sections of the Methodology dealing with the selection of the most appropriate alternative solution and the implementation of that solution were found to be incomplete. The other two problems involved the issues of clarity and practicality. The section of the Methodology dealing with the planning of the implementation of the Methodology was found to be impractical. The section of the Methodology dealing with the development of a mechanism for providing the decision maker with feedback data on the solution's effectiveness as it is being implemented was found to be unclear. Appropriate revisions were made in the sections of the Methodology in which these problems were found.

One major problem was encountered during the course of the field test. This problem involved the selection of a surrogate decision maker. A surrogate decision maker is that person or group who performs those

sections of the Methodology that the original decision maker cannot perform due to a decrease in available resources. Prior to the field test, no methodological procedures existed for the selection of a surrogate decision maker. During the course of the field test, a reasonably complete set of procedures were developed for selecting a surrogate decision maker.

A new version of the Methodology, Version IV, has been developed during the course of this study. Version IV is presented in Appendix Six. This version consists of those new procedures designed during the course of this study together with the existing procedures of Version III in which this study did not identify critical problems.

Chapter Six summarizes the results of the study, states the conclusions of the study, and delineates some of the types of research that the author believes should be performed on Version IV of the Methodology.

During the field testing phase of this study, it was demonstrated that Decision Making Methodology can accomplish its purpose in a specific uncomplicated situation. This does not mean that the Methodology will accomplish its purpose in every situation in which it is applied. This will only happen when the Methodology consists of an absolutely complete set of reasonably operational procedures that have been tested and found to be problem free.

READER'S AID TO THE DISSERTATION

The author believes that this document will be of interest to the following types of people:

1. Those whose particular type of employment necessitates their spending a great deal of resources in the making of decisions.
2. Academics whose primary interest is that of decision making.
3. Members of the general public who are interested in the problem and process of decision making.
4. Researchers whose primary area is that of methodological development.

It is assumed that each of the above groups would have different reasons for coming in contact with this document. Therefore, some groups may find some chapters more relevant than other chapters. In fact, it may be a waste of time for a person to read those chapters that are unrelated to his/her personal or professional interests. However, it would be difficult for a reader to determine the relevance of a given chapter without some information about the chapter itself. Therefore, a brief synopsis of the chapters of this document will be presented at this time.

Chapter I: Decision Making and Decision Making Methodology: How They Are Related

This chapter treats a number of issues. The first is the importance of decision making. By quoting a variety of authors,

this chapter illustrates the fact that decision making is by no means a concern only limited to the year 1975 or to the field of education. This chapter then discusses the development of modern decision making theory which is based on observations of how decisions are made as opposed to classical decision making theory which is based on beliefs as to how decisions are made. This chapter also briefly discusses the nature of and need for Decision Making Methodology. Decision Making Methodology is a reasonably operational process whose purpose is to make decisions that are optimal with respect to a person's desires. Decision Making Methodology would not be needed if there already existed a methodology for accomplishing this purpose. The author's review of the literature indicated this not to be the case. The fields of systems analysis and operations research, which are areas in which logical problem solving is stressed, and in which the author believed that he might find an operational decision making process if one existed, did not contain a technique that was both operational and designed to accomplish the purpose of making decisions that are optimal with respect to a person's desires. The techniques with which Decision Making Methodology was compared are documented in this chapter. Differences between Decision Making Methodology and these techniques are also discussed.

Chapter II: Decision Making Methodology: A Detailed Analysis

Version Three of the Decision Making Methodology consists of hundreds of distinct procedures. These procedures are organized into

the following eight major processes:

I. Prepare for the utilization of the methodology.

II. Perform a needs analysis.

III. Develop a statement of the purpose.

IV. Conceptualize the ideal solution.

V. Design the actual solution.

VI. Plan the implementation of the solution.

VII. Implement the solution.

VIII. Evaluate.

Chapter Two discusses the reasons that account for the existence of each major process of the Methodology. Major steps have been developed for the implementation of each major process. Chapter Two identifies these major steps and also provides a rationale for each. Most major steps have been broken down into sub-steps. Chapter Two also lists the sub-steps of each major step. By identifying and providing a rationale for the major processes and major steps of the Methodology, this chapter should provide the reader with a comprehensive understanding of the version of the Methodology that was being examined during the course of this study. Certain procedures of the Methodology are not included in this chapter. These procedures are the activities that have been developed to implement the sub-steps of the Methodology. These procedures are contained in Appendix Three in which a complete documentation of Version III of the Decision Making Methodology is presented.

Chapter III: Design of the Study

The problem of the dissertation is to conduct the first controlled analysis of Decision Making Methodology. A description of this problem as well as a justification of it as a relevant dissertation topic is presented in this chapter. In order to solve this problem, the Methodology was examined in order to identify "gaps" in its logic and practicality. Chapter Three describes exactly what a gap is. Chapter Three also describes the process used to identify gaps. The most critical gaps were filled through the design of new procedures. The criteria used to select the gaps to be filled are also discussed in this chapter.

Chapter IV: Results of the Logical Analysis

Many of the Methodology's procedures were redesigned due to the identification of critical problems in their logic. Extensive changes were made in the first, fourth, fifth, sixth, and seventh major processes of the Methodology. Less extensive revisions were made in major process three and in major process eight. The documentation of major process two was made more complete by adding to it procedures from an already existing Methodology.

Chapter V: Results of the Field Test

This field test was the first application of the long form of Decision Making Methodology. During the field test, the Methodology's

procedures were applied for a decision maker who had approximately forty eight hours available for making decisions in a particular problem area. During the field test, as many of the Methodology's procedures were applied as was possible, given the available resources. Each implemented procedure produced some type of results. Each procedure implemented, together with the results of implementation, are reported in this chapter. Most of the procedures worked well. However, in some cases, the results indicated that a particular procedure was working poorly. If the author judged such a procedure to be critical to the Methodology, then that procedure was redesigned or replaced. All revisions made during the course of the field test are reported in this chapter.

Chapter VI: Summary of the Results of the Study, Conclusions, and Recommendations for Further Research

One of the major results of this study has been the development of Version IV of Decision Making Methodology. As has already been mentioned, there are substantial differences between the procedures of Version III and the procedures of Version IV. The first section of this chapter restates the reasons for and substance of these differences. The second section of this chapter discusses the conclusions that can be drawn from the results of this study. The third section of this chapter discusses some of the types of research that the author believes should be performed on Version IV of Decision Making Methodology.

Methodological research can take a number of different forms. The research can be developmental--that is, needed procedures can be designed and integrated into the Methodology. The research can be decision oriented. Such research consists of applying the Methodology in a controlled fashion for the purpose of evaluating its effectiveness. The research can also be conclusion oriented. This particular type of research consists of testing propositions about the Methodology. Conclusion oriented research should only be undertaken when the Methodology or a particular section of the Methodology has been found to be problem free. Conclusion oriented research is only warranted when developmental research has produced a complete Methodology which decision oriented research has shown to be problem free. Version IV of the Decision Making Methodology is not problem free in the sense of being absolutely complete and fully field tested. Therefore, conclusion oriented research is not called for at this time. However, developmental research, the design of needed procedures and decision oriented research, the field testing of new and existing procedures are suggested.

Certain sections of the first, third, fourth, and fifth major processes of the Methodology need to have additional procedures developed for their implementation. With regards to decision oriented research, the author believes that Version IV should be submitted to the same type of analysis as was Version III. That is, first the logic of Version IV should be analyzed and if serious problems are uncovered, they should be corrected. Version IV should then be field tested in an uncomplicated situation and procedures that do not work well should

be either replaced or redesigned. If a researcher does not have enough resources for a field test of the entire Methodology, specific sections could be tested. This chapter also contains the author's recommendations as to those sections of the Methodology that he believes should be tested first.

This concludes the brief synopsis of the six chapters of this document. It is hoped that this synopsis will enable the reader to choose those chapters that are most consistent with the reader's personal and professional interests.

CHAPTER I

DECISION MAKING AND DECISION MAKING METHODOLOGY: HOW THEY ARE RELATED

Importance of Decision Making

The importance of decision making has been documented by many authors. In discussing decision making in the business world, Odiorne (1969, p. 3) has stated:

> The world of might have been is an imaginary utopia. It is filled with happy marriages that might have taken place if someone could have made up his or her mind. . . . More time is lost, success forfeited, careers stymied, and frustrations confronted from the inability to make a good decision than can be estimated. Wrong decisions made more mischief than a thousand devils working their fiendish schemes. . . . Many of our moral crises are actually crises of decision making. Albert Camus puts it, "All systems of morality are based on the idea that an action has consequences that legitimize it or cancel it."

Other authors have also attested to the importance of good decision making in business. In his book The New Science of Management Decision, Herbert Simon (1960, p. 2) notes that:

> Executives spend a large fraction of their time surveying the economic, technical, political, and social environment to identify new conditions that call for new actions. They probably spend an even larger fraction of their time individually or with their associates seeking to invent, design and develop possible courses of action for handling situations where a decision is needed.

Cyert and March (1963, pp. 289-290) hold a similar view:

> The problems of how business firms ought to make decisions--as contrasted to how they do--form the basis for an extended, growing and sophisticated literature. . . . Much modern effort in

> operations research and management science is directed toward developing decision rules and strategies for making the classic decisions within business firms.

In considering decision making in areas other than business and industry, Hodson (1974, p. 1) has stated:

> The continual process of deciding between alternative courses of action has to be one of the most pressing and ever present concerns of responsible persons. Decision makers from all walks of life use various kinds of ways to make various kinds of decisions. Especially in the social sciences and particularly in education, the literature, the methods, the systems, the meetings, the institutions, and the headaches that are devoted to the problem of decision making are truly diverse and numerous.

These authors and others (see for example Applewhite, 1965; Welsh and Cyert, 1970; Nadler, 1970; Young, 1966; and Brenthower, 1973) have made significant contributions to the field of decision making. The growing interest in this phenomena is evidenced by the existence of The American Institute for Decision Sciences, or A.I.D.S., whose goal is "to promote the development and application of quantitative methodology (decision sciences) to functional and behavioral problems of administration." The Institute has held annual meetings since 1969. The themes of some of those meetings have been "Beyond Profit--Decision Making in a Non-Profit Context" and "Advancing, Applying and Teaching the Decision Sciences." The institute also publishes The Journal of Decision Sciences. Thus, decision making is a real concern that is by no means localized to the world of business or to the year 1975.

There are currently two approaches to decision making: decision making theory and Decision Making Methodology. Decision making theory describes the attributes of good decision making while Decision Making

Methodology provides an operational process for making decisions. Theory is descriptive, methodology is prescriptive. The author's interest is Decision Making Methodology. This interest should not be taken to imply that the author believes that methodology is better than theory. Each has its place. They are interrelated; in fact, they may compliment each other. A valid decision making theory will accurately describe the state of affairs that Decision Making Methodology is designed to improve. If the Methodology is to be successful, it must be consistent with certain valid theoretical foundations. However, what will be argued in this chapter is that although decision-making theory is highly developed, the need for a Decision Making Methodology has remained largely unfulfilled. Hopefully, the present discussion will lay the foundation for a detailed analysis of the methodology which will be presented in Chapter Two. At this point, decision making theory will be discussed.

Current Decision Making Theory

What is current decision making theory? In answering this question, Cyert and March (1963) found that conventional decision making theory is based on the following two concepts: (1) organizations seek only to maximize profits, and (2) organizations operate with perfect knowledge. According to this theory, it is not only assumed that all organizational decisions are directed toward a single goal but also that in making decisions, deliberate steps are or can be taken that will provide a decision maker with absolute knowledge about the future.

If this theory were correct, it should predict how organizational decisions are actually made. Such is not the case. In fact, there is considerable disparity between how organizations make decisions and how they are supposed to make them, given the theory.

Many reasons have been postulated (Cyert and March, 1963) to explain this abberation. Some of these reasons include: in modern organizations, profit maximization is only one among many goals; it is theoretically and practically impossible to know the future with absolute certainty; the theory is only explaining relatively simple organizations which are atypical of the complex firms of today. The theory also left unanswered such major organizational questions as: What is the effect of departmental structure on the goals actually pursued in an organization? What effect does planning have on organizational objectives? How do these objectives change? When facing problems, what factors are given and what factors are manipulable? How is information processed within an organization?

Given the above inadequacies, Cyert and March (1963) set out to construct a new theory of organizational decision making. The theory was to be constructed using data about how organizations actually make decisions. The data was gathered through the use of such observational techniques as detailed analysis of letters, memoranda and other written file material, intensive interviews, and direct observation of the decision making process. The resultant theory is composed of four general concepts. These concepts are quasi resolution of conflict, uncertainty avoidance, problemistic search, and organizational learning. At this point, each concept will be discussed separately.

The theory views an organization as a coalition of individuals having different and sometimes conflicting goals. Even though certain conflicting goals must be resolved if the organization is to survive, it is not assumed that the actual process employed involves reduction of conflicting goals to some common dimension. The data indicated that such conflict is resolved in a quasi fashion through such techniques as local rationality, sequential attention to goals and acceptable level decision rules. Organizations utilize these techniques in an integrated rather than distinct fashion.

Through the use of local rationality, an organization divides its problems into sub problems and then delegates these sub-problems to specific sub-units. Through such delegation, complex problems which are most likely interrelated and very possibly in conflict are reduced to a series of simpler problems which may be addressed individually. Local rationality helps resolve conflict only if the decisions made by sub-units are internally and externally consistent. One way to ensure consistency is to employ acceptable level decision rules. These rules describe what is and what is not a good decision. By enforcing these rules directly or indirectly, sub-units are encouraged to make a certain type of decision--namely, good decisions as defined by the decision rules. Consistency among goals is also resolved by attending to goals one at a time rather than all at once. This is done because organizational goals may conflict if they are addressed simultaneously but may be compatible if they are dealt with sequentially. This also creates a time buffer between the organization's problem solving activities.

Although most modern decision making theory accepts an organization's lack of total knowledge about the future as a fact of life, Cyert and March (1963) believe that an organization does not face the uncertain future directly but rather it avoids uncertainty by using feedback reaction procedures. Using these procedures, an organization will solve those problems which are most pressing at a given point in time. This strategy avoids long range planning and in so doing avoids the question of having to face an uncertain future. In some respects, this technique is similar to sequential attention to goals. Another technique by which organizations avoid uncertainty is through the establishment of a negotiated environment. This is done by setting up certain industry wide conventions, which if adhered to will allow an organization to be reasonably confident about the present and future behavior of its competitors, thus certain types of unanticipated problems are avoided.

The theory's third concept is that of problemistic search. The real search activity of modern organizations is quite different from that of the prototype found in conventional theory. There are three major differences. First, search is motivated or stimulated by a problem. If an organization does not acknowledge the existence of a serious problem, little or no search activity will be carried out. Second, search proceeds on the basis of a simple model of causality. Search is normally undertaken in the area of the problem symptom or in the area of the current alternative. Less obvious causes and/or solutions are not normally pursued. Third, search is biased. Different decision makers view the environment differently depending upon such individual

factors as training, intuition, judgement, and available information. Thus, search activities will tend to generate solutions which are indicative of the character of the searcher rather than discover some ideal or optimal solution.

The final concept is that of organizational learning. Simply stated, this means that organizations are adaptive. They interact with their environment and this interaction results in changes in procedures, revision of goals, or shifting of attention. Stated another way, organizations have a certain degree of self control; they can modify their own behavior. The behavior of organizations is not a limited, rigid repertoire that is brought to bear without their consent.

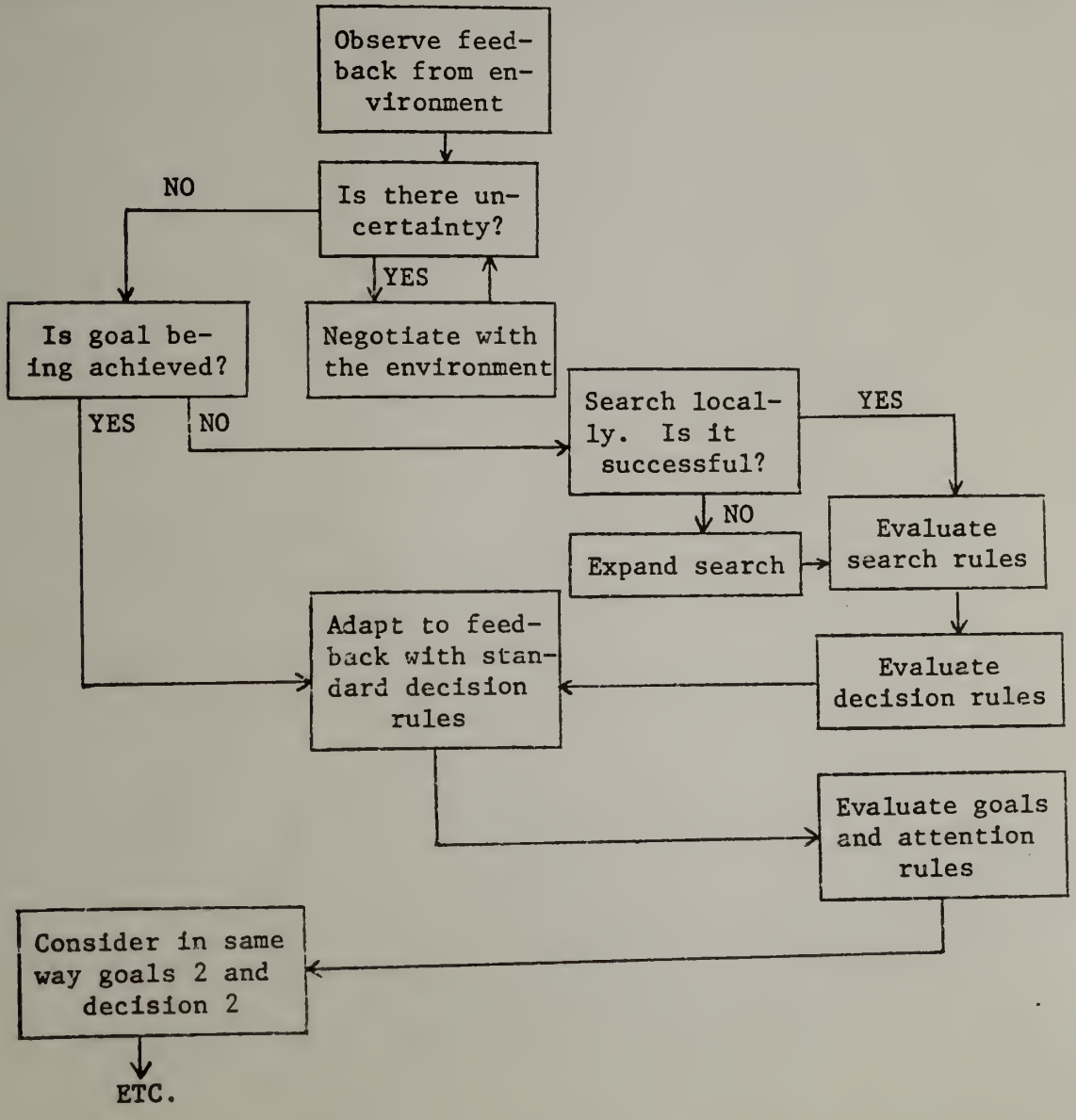
The above four concepts were used to construct a new decision making theory which is supposed to portray how organizations actually make decisions as contrasted to how they should. This theory may be expressed in terms of a decision process flow chart. The following flow chart illustrates the relationship between the decision process and the basic concepts of the theory.

If the theory were valid, it should be able to predict actual decision making behavior. Its validity was tested by using it to simulate specific decisions for such problems as price, output, capital investments and internal resource allocation. These simulated decisions were taken as predictions of what an actual organization would do in a similar situation. If the theory were correctly formulated, there would be a consistency between simulated decisions and decisions actually made by real organizations. Some consistency was found.

FIGURE 1

ORGANIZATIONAL DECISION PROCESS IN ABSTRACT FORM

Quasi-Resolution of Conflict	Uncertainty Avoidance	Problemistic Search	Organizational Learning
Goals as independent constraints. Local rationality. Acceptable-level decision rules. Sequential attention to goals.	Feedback reaction decision procedures. Negotiated environment.	Motivated search. Simple-minded search. Bias in search.	Adaptation of goals. Adaptation in attention rules. Adaptation in search rules.



Another significant contributor to the field of decision making theory is Herbert Simon. One of Simon's most noteworthy works was a series of four lectures on administration that he gave at the New York University School of Commerce, Finance and Accounting in 1960, as a Ford Distinguished Visiting Professor. Simon (1960) later expanded these lectures into a book entitled The New Science of Management Decision. In a later work (1957), Administrative Behavior, Simon attempted to reshape conventional decision making theory which up to this point had characterized a decision maker as a maximizer or as one who can and does select ideal solutions. Stated another way, conventional theory assumes that a decision maker knows what is best to do with respect to the problems that confront the decision maker. The word know is used here in an absolute sense. Dr. Simon could not accept this. His own insight and experience assured him that a decision maker does not have the capabilities implied by this characterization. Maximization not only implies that one have a knowledge of all possible alternatives but that one can state with absolute certainty that one alternative is better than all the rest with respect to solving a particular problem. Dr. Simon could not recall ever having met or heard of a decision maker who possessed these capabilities. Clearly, there was a problem. Theory and practice were at odds. On the one hand, theory assumed that a decision maker was omniscient. He/she knew all there was to know about solving his/her problems. On the other hand, it is generally believed that a decision maker's knowledge is limited. Conventional theory was not describing how decisions are actually made. Dr. Simon decided to develop a theory that would. This theory described a decision maker

as a satisficer; one who is looking for feasible rather than ideal solutions. This theory acknowledged a decision maker's limitations. A decision maker was not required to consider every possible alternative but only those that were "good enough" or that "looked good." Satisficing did not require that every outcome of every alternative be calculated in order to select a solution but rather that only the most critical outcomes be considered. Satisficing greatly simplifies what is expected of a decision maker. Its theoretical expectations are in line with the actualities of practice. Satisficing recognizes the fact that decision makers are responsible for using limited resources to produce a solution that works rather than for using unlimited resources to produce a solution that is ideal. This theory was not only more consistent with the existing documentation of how decisions are made but it also proved to be an adequate conceptual base for generating processes that reproduced certain aspects of complex human problem solving behavior (Simon, 1956), (Newell and Simon, 1956).

Current decision making theory as expressed by the above authors may be summarized as follows:

1. Organizations are complex. As mentioned earlier, conventional decision making theory is based on two concepts; the first of which is that organizations only seek to maximize profits. Cyert and March (1963) found that organizations are not directed toward the single goal of profit maximization. They found that organizations are concerned with many goals, one of which is profit maximization. They proposed a theory that describes an organization as a coalition of individuals holding goals that

may or may not be in conflict. Their decision making theory also described some of the ways in which the conflict among goals is actually resolved.

2. Decision makers have limited resources for solving problems. Historically, it was assumed that organizations operate with perfect knowledge. A decision maker with absolute knowledge would, by implication of having such knowledge, know the future with absolute certainty. The possession of absolute knowledge also implies that a decision maker can and does select ideal solutions. In conventional decision making theory, a decision maker who selects an ideal solution is described as a maximizer. Cyert and March (1963) argued that it is theoretically and practically impossible to know the future with absolute certainty. Therefore, the future is uncertain. They proposed a theory in which an organization uses a variety of techniques for dealing with an uncertain future. Simon (1957) also proposed a theory which described a decision maker as a satisficer rather than a maximizer. A satisficer is a decision maker who uses limited resources to produce a solution that works rather than use unlimited resources to produce a solution that is ideal. The resources available to the satisficer include creativity, judgement, intuition, and to some extent but not exclusively, empirical data.

The Relationship Between Decision Making Theory and Decision Making Methodology

Decision Making Methodology and decision making theory are significantly different. A valid decision making theory is a conceptual description of how decisions are actually made. An effective Decision Making Methodology is an operational description of how decisions should be made. While Decision Making Methodology provides specific rules and procedures for making decisions, decision making theory provides the general concepts and ideas by which decision making, as it is actually practiced, can be understood. This author is interested in developing a methodology for decision making which would be applicable to a wide range of decision makers and problems. The need for such a methodology is well documented. Young has observed that (1966):

> Management, the problem-solving or decision making segment of an organization, is currently undergoing a fundamental transition in both theory and practice. . . . A trend has developed toward viewing organizational decision making as an identifiable, observable and measurable process--rather than one which is essentially covert and unplanned and which relies on managerial "intuition" or judgement. (emphasis added)

Young believes that defining decision making in operational terms could enhance humanity's ability to deal sensitively and effectively with each other. Young also stated that this need for an operational decision making process is just beginning to be perceived and is still unmet. Michael and Jones (1973) have identified the same problem by detecting that our present knowledge of decision making "seldom exists in operational form."

One of the first steps in the process of methodological development is to determine if a methodology is needed. In developing Decision Making Methodology, the author had to answer the question, Does a methodology for decision making already exist? The author has been unable to find a fully developed Decision Making Methodology. If one exists, it is not readily available to decision makers at large. In making this determination, two areas were analyzed in which a Decision Making Methodology might be found. These areas were systems analysis and operations research. Since both of these areas stressed logical processes, it seemed reasonable to assume that a Decision Making Methodology might be found in one or both of them. In reviewing the area of systems analysis, the works of Dr. Gerald Nadler and Dr. Stanley Young were examined.

In his work at the University of Wisconsin, Nadler (1970) has developed the I.D.E.A.L.S. concept. The acronym stands for Ideal Design of Effective and Logical Systems. According to its developer, this concept attempts to tie together psychological, group behavior, engineering, and design theories. Nadler also proposes that this approach can be used to increase manpower effectiveness and production. The major steps of this process are:

1. Determine the function;
2. Develop the ideal system;
3. Gather information;
4. Suggest alternatives;
5. Select a solution;
6. Formulate the system;

7. Review the system;
8. Test the system;
9. Install the system;
10. Measure system performance.

This approach is unique in that it calls for the conceptualization of an ideal system which then serves as a target for the design of feasible systems, one of which will actually be implemented. However, it is unclear to this author how one would go about implementing the I.D.E.A.L.S. concept itself. In reviewing the documentation, three non-operational and, to some extent, contradictory approaches were recommended.

1. The first and the fourth steps are to be implemented via a non-sequential assemblage of questions, axioms and guides to creativity.
2. Other steps are to be implemented using some unspecified combination of the above and more specific sub-steps. This approach is to be used in carrying out step two.
3. Finally, all steps are to be implemented using the I.D.E.A.L.S. concept itself. For example, in step eight, test the system, the first step would be to determine the specific function of the testing system, then identify the ideal system target for achieving that function; then gather the information that is needed in order to determine how close one can come to the ideal systems target, etc.

Dr. Stanley Young (1966) has outlined a similar ten step process in his book, Management: A System Analysis. The components of

Dr. Young's approach are:

1. Organizational objectives must be defined.
2. Someone must raise the problem of how these goals can be achieving.
3. The nature of the problem must be investigated.
4. There should be a search for alternative solutions.
5. After full evaluation, the best alternative should be selected.
6. Organizational consensus must be achieved.
7. The solution must be authorized.
8. The solution must be implemented.
9. New decision makers must be instructed in the use of the decision.
10. An audit must be conducted for evaluating the effectiveness of the decision.

What has been stated represents the existing documentation of Young's model. This author was unable to find any further breakdown of the steps. Each of the ten steps are discussed but only from a descriptive or conceptual perspective. For example, in treating step ten, the issues of budget and output are addressed but without ever specifying how one would compile a budget or define output. Young includes a step which Nadler did not--step three--in which the cause of the problem is determined. Both techniques, however, are similar in that they do not contain operational procedures for their implementation.

It should be clear that neither author was proposing a methodology for decision making. Both approaches were comprised of general guideline statements. However, these are not the only approaches to

systems analysis. Dr. George Steiner (1969, pp. 394-397) who reviewed systems analysis from the perspective of planning has stated:

> . . . there is no uniform method for making a systems analysis. . . . Systems analysis is still in an embryonic state, is done differently by different analysts and varies much, depending upon the problem. . . each solution is a work of art, not the result of a prescribed method or formula that applies to all cases.

Systems analysts hold a similar view themselves. A well-known weapons systems analyst, E. S. Quade (1966, pp. 6-7), has stated:

> It is not easy to tell someone how to carry out systems analysis . . . . We have to do some things that we think are right but that are not verifiable, that we cannot justify, and that are never checked in the output of the work. Also, we must accept as inputs many relatively intangible factors derived from human judgement, and we must present answers to be used as the basis of other judgements. Whenever possible, this judgement is supplemented by inductive and numerical reasoning, but it is only judgement nevertheless.

Not having found a Decision Making Methodology in the area of systems analysis, the author then turned his attention to operations research. Operations research is a branch of applied mathematics that utilizes such techniques as linear programming, queing theory, PERT, CPM, PPBS, and computer based simulation. Some of these tools do have procedures that are systematized, standardized and operationally defined and, to this extent, they may be considered to be methodologies. However, a methodology is not just a collection of operational procedures; these procedures must be designed to accomplish a definable purpose. Most of the above tools seem to have been designed to accomplish somewhat varying purposes.

There are other limitations. The tools mentioned all stress computation through the use of a computer and, in so doing, leave

little or no room for the use of intuition or judgement in the decision making process. Judgement can be used in determining inputs and in examining outputs. Also, these tools are only applicable to those situations in which one is faced with a well defined problem. They have not been designed to make decisions in large ill defined problem areas. Finally, in all cases, the solution to be implemented is chosen from a predetermined set of alternatives. There is no provision for the design of new solutions.

Even though the areas of systems analysis and operations research do not seem to contain a methodology for decision making, this author cannot state with absolute certainty that a methodology for decision making does not exist in some form in some place. No one can make such an omniscient assertion. However, it may be safely assumed that if such a methodology does exist, other than the one which is the focus of this study, it is not being freely disseminated to decision makers at large. The author is also not trying to imply that other techniques for decision making are unimportant. Not only does the very existence of other techniques attest to their utility, but some of these techniques have solved problems which are beyond the present capabilities of Decision Making Methodology. This is especially true of operations research. Nevertheless, none of the tools reviewed in this chapter are a general methodology for decision making. Most of these tools are specific and limited in their application. Some are designed for a particular decision making situation; while others, such as the techniques of operations research, are designed for a limited range of decision situations. Although such techniques are reasonably operational,

their generality is limited. There are general decision making models. The work of Young and Nadler are examples of such general models. These models are usually designed to assist in decision making without regard to the decision or decision situation. Although these models are general, they are not truly methodological. They are so general that each step is subject to wide interpretation and application. The general decision making models reviewed in this chapter only offer an initial breakdown or operationalization of some of the processes by which a decision should be made. Some necessary processes are omitted. Other necessary processes are not developed past the level of a general descriptive statement.

Decision Making Methodology, which is the focus of this study, is an operationalized, standardized and systematized set of rules and procedures for making decisions that are optimal with respect to a person's desires. In so being, it represents a prescription for decision making. It is a "how to" system that can be actually used. On the other hand, its procedures are not fully operational but much more so than the systems approaches of either Young or Nadler. The Methodology also has been built to accomplish a definable purpose which is not the case with the tools of operations research.

Although Decision Making Methodology is not a theory, it has some consistency with theory. Modern decision making theory states that organizations are concerned with a wide range of problems. They are complex. The Methodology has been built to solve a wide range of problems, including those which are ill defined. Systems analysis has this capability but operations research does not. In fact, most

operations research tools can only be used to solve well defined problems in which calculation is more important than judgement. These techniques also require the use of a digital computer if they are to be used efficiently. Not all problems are well defined and not all decision makers have the resources required to employ or understand sophisticated computer programs.

Decision Making Methodology is consistent with decision making theory in another way. Modern theory states that such intangible resources as intuition, creativity and judgement are used continually in the decision making process. The Methodology provides explicit procedures for the use of these resources. The tools of operations research have no such procedures. In fact, because these techniques stress computation so strongly, they may inadvertently create a reverence for numbers and an irreverence for judgement. Steiner (1969) has made a similar observation. He has noted that techniques that rely too heavily on quantitative methods may tend to ignore the "real" world. Reality is a personal matter being expressed through such phenomena as creativity, judgement, intuition, and when appropriate, empirical data. This author believes that if one is to improve decision making, then one must identify, accept and utilize the personal realities of the decision makers involved. Failure to do so can be punishing and unbalancing to all involved.

The procedures of Decision Making Methodology will be detailed in Chapter Two. An effective methodology for decision making would be a significant contribution to the field because it would provide a prescriptive process that could be used by a wide range of decision makers in a wide range of problem situations. The purpose of this study is to

put the Methodology to empirical test. The results will be used by this author to develop a newer, more complete and hopefully more effective version of the Methodology. A completely effective Decision Making Methodology is an ideal which should be actively pursued. This pursuit involves a continually recurring cycle of development and testing. To avoid testing would be to violate the tradition of science. To assume that this pursuit would end with the conclusion of this study is to expect the improbable.

C H A P T E R II

DECISION MAKING METHODOLOGY: A DETAILED ANALYSIS

Overview of the Chapter

This chapter is designed to accomplish three purposes: first, to briefly outline the historical development of Decision Making Methodology; second, to describe at a general level the process by which methodologies are built; and third, to discuss in detail the purpose and procedures of the long form of Decision Making Methodology. An historical outline is presented so that the reader will have an understanding of the work that has been done prior to this study. This understanding should enable the reader to place the present study in proper perspective. A general description of the process of methodological development is presented so that the reader will have an understanding of how Decision Making Methodology was initially designed and how it can be further developed. The present study is concerned with further development rather than initial design. However, initial design must be discussed if the overall process of methodological development is to be understood. The specific procedures used in this study to further develop Decision Making Methodology are discussed in Chapter Three, Design of the Study. Thus, the present description of the process of methodological development is general rather than operational because the present study did not call for the use of the entire process and because the parts of the process that were used are

discussed in a later chapter. A discussion of the long form of Decision Making Methodology is presented so that the reader will have an understanding of the Methodology as it had been documented at the beginning of this study. If the Methodology was not discussed, the reader might be unaware of exactly what was examined in the course of this study.

Historical Development

The author became interested in Decision Making Methodology as a means of solving a very specific problem. The problem was the design of more effective teacher education programs. Before entering the Ed.D. program, the author believed, and still believes, that effective teacher education is critical to any viable strategy for educational reform. This belief is based on a personal observation of what educational reformers have produced so far. Most of their products require an implementer, and that implementer is usually a teacher. If a teacher is incompetent or poorly trained, the potential of a given reform might never materialize.

Thus, the author came to the University of Massachusetts, School of Education looking for a solution to the problem of teacher education. Although Decision Making Methodology is the solution that has been chosen, it was not the first one tried; in fact, it was the third. The first solution was the author's own model for the preparation of more effective teachers. This solution was discarded upon learning that the Teacher Preparation Program Council, which is the coordinating group for teacher education at the University of Massachusetts, already had

twenty four different functioning teacher education programs. To simply increase the number to twenty five seemed to be ninety percent self-serving and only ten percent advancing the field. The second solution was to learn how teacher education programs were designed. This solution was discarded when no such process could be identified, either through reading or through personal conversations with teacher educators at the University of Massachusetts. Everyone seemed to be in the dark as to how those twenty four different programs were developed. The solution that was finally settled upon, and which Decision Making Methodology represents, is to build a process for the design of teacher education programs.

In the process of developing the details of that solution, the author came in contact with Dr. Thomas E. Hutchinson and Dr. William J. Gephart. Dr. Hutchinson was involved in the development of methodologies for the social sciences. The need for methodologies has been well documented (Benedict, 1973; Coffing, 1973; Thomann, 1973). Not only did Dr. Hutchinson agree that education did not have a methodology for the design of teacher education programs, but he also believed that a methodology was a viable way of solving the problem. Thus, the author set out to build a methodology for the design of teacher education programs. As this project was proceeding, the author met Dr. Gephart who, at the time, was involved in systems design. The approach that he was using was the I.D.E.A.L.S. concept that has already been discussed in the first chapter of this document. He viewed teacher education as a particular problem that could be solved using this generalized design strategy. Dr. Gephart influenced the author to broaden his original

interest to include all design problems. The collective influence of both men directed the author to build a Design Methodology and in that Methodology to conceptualize an ideal solution first and to use that ideal as a model for the design of the actual solution to be implemented.

While the author was developing Design Methodology, Hodson et al. were developing a Decision Making Methodology for use by decision makers who had twenty five hours or less available for making decisions in a particular problem area. Hodson called this version of the Methodology a "short form." The term "short form" refers to the fact that only a limited amount of resources were available for applying the Methodology. The short form was composed of decision making procedures that could be completely implemented within twenty five hours of decision maker time. Both methodologies were developed independently during the year 1972-1973. In June of 1973, the author compared his work to that of Hodson et al. and concluded that although there were differences, the differences were not significant to warrant the development of two separate methodologies. At this point, a decision was made to develop a "long form" of Decision Making Methodology. The term "long form" refers to the fact that this version of the Methodology was to be composed of procedures to be used in situations in which a decision maker had more than twenty five hours of time available for making decisions in a particular problem area. Certain sections of Design Methodology and certain sections of the short form of Decision Making Methodology were used in the development of the long form. Throughout 1973-1974, the author developed the long form of Decision Making Methodology. This development had produced Version III of Decision Making Methodology, which is documented in

Appendix Three. The initial development of Hodson et al. is presented in Appendix One. It should be noted that all that is presently known about Decision Making Methodology is its documentation. All that exists is the Methodology's rules and procedures. No empirical data exists on the effectiveness of the Methodology.

Process of Methodological Development

There are three things necessary to the production of an effective methodology. First, a purpose must be determined. Second, the initial set of procedures for accomplishing that purpose must be drafted and developed to the point where they can be tested. Third, these procedures must be tested to identify problems and revised to the point where additional testing indicates that the procedures are problem free. Before a fully operational and completely effective methodology is produced, testing and revision must be performed a number of times.

The first step in determining a purpose is to choose the problem that the Methodology will be built to solve. Once a problem is chosen. a purpose is stated that will solve the problem. There are many procedures by which a purpose can be chosen. Some of these are: reading literature that relates to the problem, brainstorming about the problem, and talking to those who work in the problem area. Once a purpose is stated, it is examined to see if a methodology can and should be developed to accomplish it. Methodological development is only warranted in the case of a purpose that is clear, desirable, practical, and necessary. If a purpose does not meet these criteria or cannot be revised to the point where it does, then methodological development should be halted. (Thomann and Hutchinson, 1974)

In determining clarity, the methodologist is essentially determining if the purpose is understandable. Although the full meaning of the purpose need not be worked out prior to initial development, it must be determined if the purpose can be operationally defined and thereby fully understood. An operational understanding of the purpose will be required in later stages of development.

The desirability of a purpose is essentially a question of that purpose's relevance to potential clients. If every potential client considers the purpose to be irrelevant, if they all view it as dealing with an important problem in a way that is unimportant to them, then a methodology designed to accomplish that purpose will most likely not be used. In this case, the purpose would be undesirable. However, a purpose need not be desirable to every potential client. The purpose need only be desirable to enough potential clients so that a methodology designed to accomplish this purpose will be used. If a methodology were never used, than the resources consumed in development will have been wasted. How many and what kinds of potential clients would have to accept the purpose before it was considered desirable is a subjective determination made by the individual methodologist who is carrying out the development.

A purpose must also be practical. In determining the practicality of the purpose, a methodologist must view that purpose in light of the resources that are actually available for development and in light of the resources that will probably be available for application of that methodology once it has been developed. If the purpose implies procedures that clearly cannct be developed, given the resources

available for development, then that purpose is impractical. It might be unwise to begin a program of development that obviously cannot be completed. If the purpose requires procedures that clearly could not be applied, given the resources that potential clients would probably have available for an application, then that purpose is also impractical. In this case, developmental work would not be justified because such work may produce a methodology that will most likely not be used. Thus, a purpose must be practical from both a developmental and an application point of view.

The final criterion against which the purpose is examined is that of necessity. Methodological development is unnecessary when a fully developed methodology for accomplishing the purpose already exists and has been found to be completely effective. If an existing methodology is sufficient for accomplishing the purpose, then there is no need to build another.

Once an acceptable purpose has been determined, the initial set of procedures for accomplishing that purpose must be developed. These procedures should be as operational, systematic and standardized as they can be, given the resources available for development. Initial development begins with the production of a skeletal outline of the methodology. This outline is the first approximation of what the fully developed methodology will look like. This outline consists of those procedures that seem to be necessary to accomplish the purpose. All these procedures are suggested by or can be deduced from the purpose. In other words, the procedures making up the methodology are implications of the methodology's purpose. Initial development ends

with a version of the methodology that can be tested. This version is produced by applying to specific procedures within the original outline the process that was used to develop the outline itself. The procedures to be further developed are those that are both crucial and unclear. A crucial procedure is one that must be implemented successfully if the methodology is to accomplish its purpose. Although every procedure within a methodology should be implemented successfully, if a procedure does not have to be implemented successfully, it should not be part of the methodology--some procedures are more important than others. When the success of a methodology is directly dependent upon a specific procedure, that procedure is considered crucial. An unclear procedure is one that does not clearly imply the steps needed for its implementation. If a procedure does not seem easy to implement, then that procedure is considered unclear. By using the criteria of clarity and importance, further development is focussed on those procedures that need it the most. Testing may be performed once the methodology appears as if it can be implemented without major difficulty.

In most cases, the version of the methodology to be tested will not be a fully developed methodology. All the procedures necessary to accomplish the purpose will not have been developed. Initial development could have been carried to the point where the methodology is fully operational; however, this would require that a methodologist develop and document every single behavior that would be required to apply the methodology successfully in all possible situations. Such extensive development would require much more resources than are

usually available for initial development. In most cases, initial development is halted when the costs of further development outweigh the expected improvements in the methodology. This is a type of cost benefit analysis. The point at which development is halted is a subjective determination made by an individual methodologist.

The final phase of methodological development involves testing and revision. Testing is done because a methodologist never knows everything that must be done to accomplish the purpose of the methodology. Without testing, a methodologist can never be absolutely sure that the procedures that have been developed so far represent all the procedures that are needed. Stated another way, methodological development is always undertaken with limited knowledge. There is an ever present risk that procedures that look adequate on paper will be inadequate when they are applied. Continual testing minimizes this risk by identifying which of the existing procedures are inadequate. Having made this identification, new procedures can be developed. In doing so, the methodology is made more complete and hopefully more effective. The risk of failure is ever present. It can never be completely eliminated because a methodology is very rarely developed to the point where it represents a complete set of problem free procedures. There will always be a certain amount of uncertainty because of a certain amount of incompleteness. However, both uncertainty and incompleteness can be minimized through extensive development and testing.

A methodology should be tested through the use of both conclusion and decision oriented research procedures. Decision oriented research involves field testing the entire methodology or a particular

part of it. In field testing, the methodology is applied in a controlled fashion to find those procedures that do not work well. The application is controlled in the sense that as the methodology is being applied, it is also being systematically evaluated. The criteria for evaluation depend on what is being field tested. When the entire methodology is being tested, evaluation criteria are derived, in part, from the main purpose of the methodology. However, when a particular part of the methodology is being tested, criteria are derived, in part, from the sub-purpose of the part being tested. The purpose of the field test is to identify problems in the methodology. Only when successive field tests have failed to identify major problems should conclusion oriented research procedures be applied. These procedures would involve testing propositions about the methodology. In so doing, knowledge is generated about the methodology itself.

Methodological development does not end with initial testing. The first test to which a methodology is subjected will most likely identify only some of the problems that need to be solved. New procedures must then be developed to solve the problems identified. These new procedures must also be tested to see if they are effective. If not, additional procedures must be developed. Testing, at any stage of development, indicates what additional development needs to be done. Development is halted only when the methodology is perfect--when it represents a complete set of problem free procedures.

Purpose of Decision Making Methodology

The purpose of Decision Making Methodology is "to make decisions that are optimal with respect to a person's desires" (Hodson, 1974). This purpose warrants the development of a methodology to accomplish it because the purpose is desirable, necessary, definable, and practical.

The purpose is desirable because a reasonable number of decision makers have expressed a willingness to use a methodology designed to accomplish this purpose. This willingness indicates that Decision Making Methodology will probably be used once the methodology has been developed to the point where it is reasonably operational and reasonably effective. Some of the decision makers who found the purpose desirable said that the reason for their acceptance was that the phrase "optimal with respect to a person's desires" puts a decision maker in control of the decision making process. This phrase requires that any decision made using the methodology must be consistent with the desires of the decision maker(s) for whom the methodology is being applied. However, an acceptance of the purpose by some decision makers is not a final test of the purpose's desirability. In fact, other decision makers and possibly many decision makers may find the purpose undesirable. However, the purpose need not be desirable to every decision maker. In fact, unanimous acceptance of the purpose by all decision makers would be unlikely to result and improbable to expect. The purpose need only be desirable to enough decision makers so that a methodology designed to accomplish this purpose would not go unused. If Decision Making Methodology had absolutely no utility, the resources used to develop it would have been wasted. How

many and what kind of decision makers would have to accept the purpose of Decision Making Methodology before the purpose was considered desirable was a subjective determination made by the initial developers.

The purpose is necessary because this author (Heffernan, 1974) and other methodologists (Hodson, 1974) have been unable to find a fully developed Decision Making Methodology that accomplishes this purpose. Two areas were analyzed in which a Decision Making Methodology might be found. These areas were operations research and systems analysis. A number of techniques were examined in each area. Each of the techniques reviewed were found to contain one or both of the following flaws:

1. They did not have as their purpose "to make decisions that are optimal with respect to a person's desires."
2. They contained procedures that were more general than operational.

While the techniques of systems analysis that were examined contained both of the above flaws, the techniques of operations research contained only the first.

The purpose, to make decisions that are optimal with respect to a person's desires, is definable because its most critical concept can be operationally defined. An operational definition of this phrase will produce some of the criteria necessary to evaluate the methodology. Any procedure that does not contribute to making decisions "that are optimal with respect to a person's desires" would be considered defective and would have to be revised. A desire may be operationally defined as anything a decision maker says he/she or others need. Thus, a desire may be

considered equivalent to a need. However, no one will ever know if a decision is optimal unless needs are measured before and after a decision is made. A reasonably operational process for the measurement of needs already existed prior to the development of Decision Making Methodology. This process was Needs Analysis Methodology which had been developed by Coffing and Hutchinson (Coffing and Hutchinson, 1973). Needs Analysis Methodology provides operational procedures for determining, defining and measuring needs. Decision Making Methodology requires operational procedures for determining, defining and measuring desires. Without these procedures, Decision Making Methodology cannot accomplish its purpose. Many of the procedures of Needs Analysis Methodology can be used in Decision Making Methodology because a need and a desire are nearly equivalent concepts. A need and a desire both refer to something that is wanted or required. Thus, the purpose of Decision Making Methodology is definable because the type of decision to be made using the methodology can be determined through the use of an existing operational process.

The purpose of Decision Making Methodology--to make decisions that are optimal with respect to a person's desires--is practical because the procedures necessary to accomplish it do not seem impossible to develop or impossible to apply once they are developed. Two of the most critical procedures implied by the purpose are determining the desires of a decision maker, and evaluating a decision that has been designed and implemented to satisfy these desires. The desires of a decision maker are needed in order to determine the problems to be solved using the methodology. An evaluation is needed to determine whether or not

the chosen problems have actually been solved. It has already been mentioned that many of the procedures necessary to determine the desires of a decision maker existed prior to the development of Decision Making Methodology. These procedures were part of Needs Analysis Methodology (Coffing and Hutchinson, 1973). Many of the procedures necessary for evaluating a particular decision also existed prior to the development of Decision Making Methodology. These procedures were part of Evaluation Methodology (Hutchinson, 1973). Thus, the purpose of Decision Making Methodology is practical from a developmental point of view because some of the most critical procedures for accomplishing the purpose had already been developed.

Another critical procedure implied by the purpose is that of planning. Planning is critical because it is needed to insure that the methodology can be applied practically. The procedures for planning an application of Decision Making Methodology are already well developed and provide for such things as: the identification of the resources that a decision maker has for making decisions in a particular problem area; the selection of the specific problems to be solved from within the problem area; and the allocation of the identified resources to each of the chosen problems. Using the information obtained in planning, a methodologist can make a preliminary determination of what procedures are to be used in a particular application. Only procedures that can be applied within the available resources will be used. This determination is preliminary because it is made with limited knowledge of the amount and the type of work that a specific decision maker can do in a given amount of time. As an application of Decision Making Methodology proceeds, a methodologist will gain more knowledge about the capabilities

of the decision makers for whom he/she is applying the methodology. This new knowledge will be used to confirm or modify any future procedures that have been planned. Because the methodology provides for identifying and adapting itself to the resources and capabilities of the decision makers for whom it is being applied, the methodology should be able to be applied practically. The present study is designed to determine and improve the extent to which the methodology can be applied practically.

Because the purpose "to make decisions that are optimal with respect to a person's desires" is desirable, necessary, definable, and practical, it warrants the development of a methodology to accomplish it.

Overview of the Remaining Sections of the Chapter

A very complex set of procedures has been developed for implementing Decision Making Methodology. To discuss each procedure separately would require an analysis that would be unnecessarily detailed and lengthy. The procedures that will be discussed are those that the author believes will provide the reader with an understanding of the Methodology at a level of specificity that is relevant but not frustrating. If the present discussion is successful, the reader will be able to examine the entire Methodology without feeling overwhelmed. A complete version of the Methodology is included as an appendix to this document.

The procedures of Decision Making Methodology have been divided into the following eight major processes:

1. Prepare for the utilization of the methodology.
2. Perform a needs analysis.
3. Develop a statement of the purpose.
4. Conceptualize the ideal solution.
5. Design the actual solution.
6. Plan the implementation of the solution.
7. Implement the solution.
8. Evaluate/reimplement the solution.

The discussion of these procedures will be divided into two parts. In the first part, each major process will be discussed separately using the following format: First, the purpose of each major process will be stated and its desirability will be discussed; second, the major steps of that major process will be presented in narrative form. In the second part, the major steps of each major process will be discussed. The format used in the second part will be slightly different. First, the overall logic of the step will be presented. Second, any sub-steps that have been developed to implement that step will be listed as they appear in the Methodology.

Rationale for the Eight Major Processes of Decision Making Methodology

1.0 Prepare for the Utilization of the Methodology

Decision Making Methodology can be used in a number of ways. In most cases, any utilization will require some preparation. The purpose of this major process is to prepare the reader for using the Methodology in certain specific ways. In so doing, the reader is treated more as an individual by being provided with a number of ways of using the Methodology rather than being limited to a single mode of utilization.

This preparation involves identifying the desires of the reader and then directing the reader to that part of the Methodology which will best meet these desires. This direction may place the reader in Step 1.4, "Prepare the Methodologist," if the reader is a person who is interested in learning Decision Making Methodology but who has no substantial background in this particular methodology. Using these procedures, the reader will be taught by an experienced methodologist how to apply the Methodology. If the reader is interested in having the Methodology applied for him/herself or others, the reader is directed to Step 1.5, "Negotiate a Decision Making Contract." Using these procedures, an experienced methodologist will negotiate an application of the Methodology with the reader for making decisions in a particular problem area. A special situation exists when the reader is an experienced methodologist. In this case, the reader will probably have a very particular purpose for coming in contact with Decision Making Methodology. When this happens, the experienced methodologist first states his/her purpose and is

then directed to that section of the Methodology that will best accomplish that purpose.

2.0 Perform a Needs Analysis

The purpose of this step is to identify, define and measure the needs that a decision maker is interested in meeting within the problem area. This is done because a problem may be defined as an unmet need. When he/she is provided with needs data, the decision maker is made aware of the range of problems that could be solved using the Methodology. From this set of problems, the decision maker can choose the specific problem(s) that the Methodology will be applied to solve.

The rules and procedures used here are essentially those of the Coffing/Hutchinson Needs Analysis Methodology (Coffing, Hodson and Hutchinson, 1973). These procedures involve determining, defining and measuring the needs that a decision maker is interested in meeting. The first step in this process calls for eliciting and then organizing the concerns of a particular decision maker into a series of phrases of the following form: "who needs what according to whom." The persons who have a particular type of need are called "needers". The "according to whom" persons are called "definers". Having done this, a particular need of a particular needer is then defined by the definer in operational terms. The final phase of this major process involves the actual observation of the degree to which a definer's definition of a particular need is presently being met.

3.0 Develop a Statement of the Purpose

At this point, the decision maker develops a defined statement of what he/she wants the solution to accomplish once it is implemented. This purpose embodies the real concerns of the decision maker and this purpose is used throughout the subsequent steps of the Methodology. The purpose is used in the generation of alternative solutions and to evaluate the effectiveness of the solution that is finally implemented. The purpose literally controls what the Methodology does. Since the purpose is used so often and since it embodies the real concerns of the decision maker, the control of the Methodology is given to the person for whom the Methodology is being applied; that person is the decision maker.

In developing a statement of the purpose, the decision maker is taken through the following four activities. First, the decision maker chooses the unmet need/problem to be worked on. Second, the methodologist determines what is presently known about solving the problem. Third, a statement of purpose is developed. Fourth, the purpose is tested to make sure that a solution can/should be designed to accomplish it. This testing involves examining the purpose as stated to make sure that it is clear, desirable, practical, and necessary.

4.0 Conceptualize the Ideal Solution

The purpose of this major process is to have the decision maker conceptualize the ideal way of accomplishing the purpose. The solution does not have to be practical; it need only be the most

desirable way of accomplishing the purpose according to the decision maker. By conceptualizing an ideal solution first, the creative potential of the decision maker is released because the decision maker is free to think up solutions that would go far beyond his/her present resource capabilities. This process also heightens the commitment of the decision maker to the Methodology. This happens because all subsequent procedures are aimed at implementing the ideal as is or in a form which is as nearly ideal as possible. Thus, the decision maker's participation in the Methodology represents making the ideal as much a reality as possible.

In order to conceptualize an ideal solution, the decision maker must first define what he/she means by an "ideal solution." Then a list of alternative solutions that are consistent with that definition are generated. This list is then tested for completeness by having the decision maker generate usual solutions to the problem and then change each usual solution so that it is consistent with his/her definition of an ideal solution. All alternative ideal solutions are then combined into a single list from which the decision maker chooses the most appropriate. The final phase of this major process calls for the ideal solution to be reviewed by the decision maker and by any relevant others to determine if the ideal can be implemented. If this review indicates that the ideal is practical and can be implemented as is, the decision maker is sent to major process number seven, "Implement the Solution." Using these procedures, the decision maker will carry out the ideal solution. If this review indicates that the ideal is practical but requires additional planning prior to its

implementation, the decision maker is sent to major process number six, "Plan the Implementation of the Solution." Using these procedures, the decision maker will develop all the operational details needed to implement the ideal solution. If this review indicates that the ideal is impractical, then the decision maker is sent to major process number five, "Design the Actual Solution," where a feasible alternative to the ideal solution will be designed. This reviewing process assures that the ideal will be implemented as is or with as little modification as possible.

5.0 Design the Actual Solution

Using these procedures, the decision maker will design a feasible alternative to an impractical ideal solution. This is done to make sure that the Methodology designs a solution that the decision maker can actually implement. If this were not done, a decision maker would be left with a real problem and an unreal solution. As the ideal is changed, its original conceptualization serves as a target representing the most desirable way of accomplishing the purpose. Every effort is made to bring the feasible solution closer to this ideal target.

The procedures used here are essentially the same procedures as were used in Step 4.0, "Conceptualize an Ideal Solution." The only difference is that a feasible solution is being generated rather than an ideal solution that would not be feasible.

6.0 Plan the Implementation of the Solution

The purpose of this step is to develop all the operational details necessary to implement the solution. These details may be divided into two categories: the solution itself and a plan for making decisions about the solution as it is being implemented. Developing these details prior to implementation will maximize the possibility of a decision maker solving the problem for two reasons. First, a solution stated in terms of a sequenced list of operational activities provides the decision maker with a clear path to follow in accomplishing the purpose. Second, a tested plan for decision making provides the decision maker with a reliable way of managing the solution once it is installed.

Planning the implementation of the solution involves defining the solution first in terms of its parts and then in terms of all the activities needed to carry out each part. All these activities are then organized into a single chronological list, regardless of the part to which they belong. Each activity on this list is then reviewed separately to make sure that it is appropriate with respect to the present skills of the person who is expected to perform the activity, and also to make sure that all of the resources that are needed to carry out that activity will be available at the appropriate time. The whole list of activities is then reviewed as a single unit to make sure that there are no internal or external conflicts. Once all critical activities have been designed and reviewed, a plan for making decisions as these activities are being carried out is designed and tested. The end result of this major process is an operational solution

to the problem and a tested plan for managing that solution once it is installed.

7.0 Implement the Solution

In this major process, the solution is implemented. In so doing, the solution is tested to see if it can accomplish the purpose that it was designed to accomplish.

In implementing the solution, the decision maker carries out as many of the solution's activities as he/she can, according to the chronological order specified in the previous step. Any decisions that must be made in order to manage these activities are made using the tested plan for decision making.

8.0 Evaluate/Reimplement the Solution

Having implemented the solution, two types of decisions need to be made. The decision maker needs to decide if the purpose has been accomplished and the methodologist needs to decide if the Methodology has been effective. If these decisions are not made, the decision maker will never know if the problem has been solved and the methodologist will never know where and to what extent the Methodology needs to be improved.

The same set of data is used to make both types of decisions. The data used describe the degree to which the purpose has been accomplished. The same set of data can be used by both decision maker and methodologist because their decisions are interrelated. If the solution is effective, then this provides supportive evidence that the

Methodology is effective to some degree because the Methodology was used by the decision maker to design the solution in the first place. These data are compiled by gathering all the information that was used to make decisions as the solution was being implemented. Each component of the decision maker's operational definition of the purpose is then reviewed in light of these data to see if it has been accomplished. The methodologist then reports to the decision maker the number (completeness) and the priority (focus) of the components that have been accomplished. If the Methodology is effective, it will have produced a solution that was as complete and as focussed as permitted by the available resources. If the degree of focus or completeness is unsatisfactory to the decision maker, the methodologist first links the problem to a specific prior step in the Methodology itself and then presents the decision maker with the option of having the solution reimplemented, making any needed changes starting from the step at which the problem originated. It should be noted here that a solution is only reimplemented if the desires and resources of the decision maker warrant it.

Rationale for the Major Steps of Major Process 1.0: Prepare for the Utilization of the Methodology

Of the Methodology's eight major processes, the first is the most highly developed. This major process consists of the following six major steps:

1.1 The reader determines his/her frame of reference.

1.2 Develop a current version of the Methodology.

1.3 Disseminate the Methodology.

1.4 Prepare the methodologist.

1.5 Negotiate the decision making contract.

1.6 Plan the application of the Methodology.

Sub-steps have been developed for implementing each of these six major steps. Almost every sub-step has specific procedures for its implementation. Due to the complexity of the first major process, it will be discussed in greater detail than the other seven major processes of the Methodology. In discussing the other seven major processes of the Methodology, only the logic of their major steps will be presented. Procedures that have been designed for implementing a particular major step will be listed as they appear in the Methodology. However, in discussing the first major process, the logic of both its major steps and its sub-steps will be presented.

The first four major steps of the first major process were designed to be used in methodologies other than Decision Making Methodology. In other words, these steps are supposed to be generalizable across many methodologies. These steps were developed in this fashion because the author believed that the procedures necessary for their implementation are not dependent upon a particular methodology. Steps 1.2, 1.3 and 1.4 all have a specific sub-step for choosing the methodology to be developed,

disseminated or taught. However, for the purposes of this discussion, it will be assumed that Decision Making Methodology is the methodology that has been chosen. This assumption is made because this document is specific to Decision Making Methodology. This assumption will also permit a more focussed discussion of the first four steps of the first major process. If this assumption were not made, a variety of other methodologies would have to be discussed in order to illustrate the logic of these generalizable steps. Therefore, in discussing the first four major steps of the first major process, specific illustrative references will be made to Decision Making Methodology. Also, whenever the phrase "the Methodology" appears in the wording of one of these steps, it refers to Decision Making Methodology.

1.1 The reader is asked to determine his/her frame of reference by identifying which of the following groups that he or she belongs to.

People coming in contact with Decision Making Methodology differ in many ways. Two of the most significant are prior experience with the Methodology and the way in which they expect to use the Methodology. A reader's prior experience may range from substantial to non-existent. A reader's expectations for utilizing the Methodology may range from applying it, testing it, further developing it, disseminating it, teaching it, or hiring a methodologist to apply the Methodology for the reader or for someone else. In most cases, any utilization will require preparation.

However, before a reader can be prepared to utilize the Methodology, the reader's experience and expectations must be known so that preparation can be individually prescribed. In this major step, the experience and the expectations of the reader are determined. Once this is done, the reader is cycled to the most appropriate preparation sequence.

1.1.1 A person who is interested in learning the Methodology but who has no substantial experience in methodologies. In this case, the reader should proceed to step 1.4.4.4.6 (Preparing the methodologist).

Using these procedures, the reader will be taught by an experienced methodologist how to apply the Methodology.

1.1.2 A person who is interested in having the Methodology applied for them in order to solve some problem. In this case, the reader should proceed to step 1.5.2.2 (Negotiate the decision making contract).

Using these procedures, the reader will negotiate with an experienced methodologist for an application of the Methodology.

1.1.3 A person who has some substantial experience in methodologies.

It is possible that a highly trained methodologist will have a very particular reason for coming in contact with Decision Making Methodology. For example, he/she may not be interested in applying the Methodology and he/she may not be interested in learning to apply the Methodology. His/her interests may be more along the lines of development and testing. This sub-step provides for prescribing a preparation program that is commensurate with the desires and experience of a trained methodologist.

1.2 Develop a current version of the Methodology. (This step may be performed anywhere in the utilization of the Methodology. It is included here in order to highlight the desirability of developing a current version of the Methodology prior to any substantial effort to utilize it through teaching, application or dissemination.)

Usually, Decision Making Methodology is being used by many people simultaneously. Each utilization will most likely uncover points at which the Methodology needs to be improved. Improvements may be needed for a number of reasons: certain necessary procedures might be missing or the existing procedures may be poorly worded or incorrectly sequenced. When all the necessary improvements have been made, the Methodology will be fully developed. At this point, Decision Making Methodology may not be considered to be perfect. A perfect Methodology is produced by developing, utilizing and revising successive versions of the Methodology, each of which requires fewer and fewer improvements. This step provides

procedures for producing a version of the Methodology that is more complete and hopefully more effective than previous versions.

1.2.0 Plan the implementation of this step.

This step consists of a reasonably operational set of procedures for deciding how to use the resources that are available for developing a current version of Decision Making Methodology. Usually there are only limited resources available for implementing these procedures. Therefore, the application of these procedures must be carefully planned if major problems of effectiveness and efficiency are to be avoided. Planning does not necessarily eliminate these problems but it can very definitely minimize them. At present, specific planning procedures have not been developed. When such procedures are developed, this sub-step will not only provide for choosing which development procedures can be applied within the available resources but also for evaluating and modifying the chosen procedures if they are considered to be working poorly during actual implementation.

1.2.1 Choose the Methodology to be developed.

In this sub-step, the methodology to be developed is chosen. For the purpose of this discussion, it will be assumed that Decision Making Methodology will have been chosen. This selection can be based

on the interests and capabilities of the methodologist and/or on the needs of the population that the methodologist is interested in serving. When this step is more fully developed, additional selection criteria will be added.

1.2.2 The developer identifies all those who have utilized any version of the methodology to be developed.

In the course of Decision Making Methodology's development, not only will different people have utilized the Methodology but different people will have utilized different versions of the Methodology. Each utilization of each version probably uncovered points at which the Methodology could be improved. Each potential improvement represents a problem in the existing procedures. While some utilizers may have simply documented the problems that they uncovered, other utilizers may have improved the Methodology by designing new procedures. Problems uncovered and improvements made may not be common knowledge. This happens when there are no formal lines of communication among methodologists. This may also happen when an existing communication system is not actually used. Before a current version of Decision Making Methodology can be produced, two types of information need to be gathered. First, what problems uncovered in the Methodology are still unsolved. Second, what new procedures have been designed but have not been incorporated into the Methodology. Given this information, developing a current version of Decision Making Methodology could involve solving unsolved

problems and/or integrating unincorporated procedures. In the absence of a formal communication system among methodologists, this information can only be obtained by directly contacting those who have utilized or who are utilizing the Methodology. Before past and present utilizers can be contacted, they must be identified. This sub-step provides the necessary identification procedures.

1.2.3 Test the list of utilizers for completeness.

The previous sub-step produced only a partial list of utilizers. The list is partial because the resources available for its development were limited. If unlimited resources had been available, then an absolutely complete list of utilizers could have been developed. Unlimited resources would have permitted unlimited search. The purpose of this sub-step is twofold: first, to provide the developer with additional lists of utilizers; and second, to allow the developer to modify his/her original list in any way that he/she sees fit, given the additional lists. By providing the developer with additional lists, a wider range of information is used in the development process. By providing the developer with the option of changing his/her original list of utilizers, the developer is given the chance to redirect the development process along more relevant lines. The effectiveness of the development process is increased as a wider range of information is used in the process and as the developer is allowed to use his/her intuitive and judgemental powers to redirect the process along lines that carry a higher degree of personal commitment and relevance.

1.2.4 Identify gaps found in the Methodology by the utilizers.

Gaps are points at which there are breaks or interruptions in the continuity of Decision Making Methodology. The Methodology is fully developed when it is gap free. Each successive version of the Methodology should contain fewer and fewer gaps. This sub-step provides for identifying the gaps that have been uncovered and which are still unfilled. This list represents some of the improvements that can be made in developing a current version of the Methodology.

1.2.5 Test the list of gaps for completeness.

The previous sub-step produced only a partial list of gaps. The list is partial because the resources available for its development were limited. If unlimited resources had been available, then an absolutely complete list of gaps could have been developed. The purpose of this sub-step is twofold: first, to provide the developer with additional lists of gaps; second, to allow the developer to modify his/her original list in any way that he/she sees fit, given the additional lists. By providing additional lists, a wider range of information is used in the development process. By providing the option of changing his/her original list of gaps, the developer is given the option of redirecting the development process along more relevant lines.

1.2.6 Further develop the Methodology by filling the most critical unfilled gaps.

A current version of Decision Making Methodology is produced by filling some of the gaps that have been identified in the previous two steps. The gaps to be filled are those that are both crucial and unclear. A gap is crucial if its existence seriously limits the effectiveness of the Methodology. A gap is unclear if it does not clearly imply the procedures necessary to fill it. This step provides procedures for identifying and filling those gaps that are both crucial and unclear.

1.2.7 Evaluate.

The purpose of this sub-step is to determine if the six previous sub-steps have been effective. If sub-steps 1.2.1 through 1.2.6 have been effective, then a current version of Decision Making Methodology will have been produced. If a current version of the Methodology has not been produced, then the above procedures are assumed to be inadequate. At present, no specific procedures have been developed for implementing this sub-step. When this sub-step is more fully developed, it will not only provide for determining the effectiveness of the previous six sub-steps but it will also provide for the redesign of those sub-steps that are found to be ineffective or for the reimplementation of those sub-steps that were applied incorrectly.

1.3 Disseminate the Methodology.

Decision Making Methodology is built to be used. However, before the Methodology can be used, it must be made available to those who need it. In other words, the Methodology must be disseminated. This step provides the necessary dissemination procedures. Dissemination is often confused with advertising or with public relations. Both public relations and advertising involve convincing as many people as possible that they need to utilize a particular product. In many cases, the people are matched to the wrong products. In public relations and advertising, the consumer is simply exposed to existing products rather than being provided the products that the consumer believes that he or she needs. Dissemination, as the term is used here, does not involve either public relations or advertising. The procedures do not involve making people like products that they would dislike if outside pressure were not applied. Dissemination, as here defined, involves meeting a consumer's needs as defined by that consumer. This is done by providing the consumer with a particular product--in this case, Decision Making Methodology.

1.3.1 Plan the implementation of this step.

This sub-step consists of a reasonably operational set of procedures for deciding how to use the resources that are available for disseminating Decision Making Methodology. Usually there are only limited

resources available for implementing these procedures. Therefore, the application of these procedures must be carefully planned if major problems of effectiveness and efficiency are to be avoided. Planning does not necessarily eliminate these problems, but it can very definitely minimize them. At present, specific planning procedures have not been developed. When such procedures are developed, this sub-step will not only provide for choosing, which dissemination procedures can be applied within the available resources, but also for evaluating and modifying the chosen procedures if they are considered to be working poorly during actual implementation.

1.3.2 Choose the Methodology to be disseminated.

In this sub-step, the methodology to be disseminated is chosen. This selection can be based on the interests and capabilities of a methodologist and/or the needs of the population that the methodologist is interested in serving. When this step is more fully developed, additional selection criteria will be added. For the purposes of this discussion, it will be assumed that Decision Making Methodology will have been chosen.

1.3.3 Define the class of problems that the methodology is capable of solving.

Decision Making Methodology is built to solve a class of problems. A class of problems is a grouping of individual problems. In the

case of Decision Making Methodology, its problem class is a grouping of all non-programmed decision making problems. All of the individual problems within the problem class share certain characteristics and the class itself may be defined through the use of these shared characteristics. The Methodology's procedures are designed to deal with the shared characteristics of its class of problems. If the Methodology is effective, then an individual problem from within the class of problems will be solved by applying the Methodology's procedures to that problem. The Methodology should not be disseminated to someone who is interested in solving problems that are outside the class of problems that the Methodology has been built to solve. However, before the disseminator can identify to whom the Methodology should be disseminated, the disseminator must first define the class of problems that the Methodology has been built to solve. This sub-step provides the necessary identification procedures.

1.3.4 Develop a list of potential utilizers of the Methodology.

The purpose of this sub-step is to identify those people who are interested in solving the type of problem that the Methodology has been built to solve. These people represent potential utilizers of the Methodology. The Methodology will be disseminated to the most appropriate potential utilizer.

1.3.5 Identify the most appropriate potential utilizer.

Not everyone who is interested in using Decision Making Methodology can use it effectively. It would be unwise to disseminate the Methodology to anyone who would be unable to use it once they had it in their possession. Effective utilization requires certain prerequisites. These prerequisites may be expressed as concepts that the potential utilizer must find desirable. This sub-step provides for identifying and defining the concepts that a disseminator believes are needed for effective utilization of the Methodology. The Methodology will be disseminated to the person who finds the chosen concepts most desirable.

1.3.6 Determine the degree to which the Methodology will solve the problems of the potential utilizer.

In the previous sub-step, the most appropriate potential utilizer was identified. In this step, the chosen potential utilizer is allowed to determine for him/herself whether or not the Methodology can solve the problems that he/she is interested in solving. This determination is made by examining the Methodology in the light of the problems to which it will be applied. The potential utiiizer must be certain that the Methodology will work. It makes little sense to disseminate the Methodology to one who is not convinced of its utility. This sub-step places the power of final acceptance in the hands of the potential utilizer and not in the hands of the disseminator or any other outside agent.

1.3.7 Plan the utilization of the Methodology.

Decision Making Methodology can be utilized in many ways. A person could negotiate for an application of the Methodology. A person could learn the Methodology and then apply it him/herself. The way in which the Methodology is to be utilized should be determined by the potential utilizer and not by the disseminator. This sub-step provides for determining how the potential utilizer would like to utilize the Methodology and then cycling the potential utilizer to those activities that will provide any necessary prerequisite skills.

1.3.8 Evaluate.

The purpose of this sub-step is to determine if the seven previous sub-steps have been effective. If sub-steps 1.3.1 through 1.3.7 have been effective, then Decision Making Methodology will have been properly disseminated. If the Methodology has not been disseminated properly, then the above procedures are assumed to be inadequate. At present, no specific procedures have been developed for implementing this sub-step. When this sub-step is more fully developed, it will not only provide for determining the effectiveness of the previous seven sub-steps but it will also provide for the redesign of those sub-steps that are found to be ineffective or for the reimplementation of those sub-steps that were applied incorrectly.

1.4 Prepare the methodologist.

In this sub-step, a person is taught how to apply Decision Making Methodology. Such training is provided for three reasons. The first reason is that of cost. It is less expensive to apply the Methodology yourself than it is to hire a methodologist to apply the Methodology for you. In fact, a methodologist's services may be well beyond the financial capabilities of quite a large number of people. However, the costs of being instructed in the use of a particular Methodology may be much less prohibitive. Therefore, providing for Methodological training increases the number of people who can make use of the Methodology. The second reason is that of completeness. A complete Decision Making Methodology is one that is fully operational one which has every procedure necessary for its implementation stated in terms of directly observable behaviors or states. If Decision Making Methodology were complete, then a person wishing to apply it would not require any prior training. Applying a complete Decision Making Methodology simply means reading and carrying out the Methodology's procedures exactly as they are stated. However, Decision Making Methodology is not complete. Some of the procedures necessary for implementing the Methodology have not been developed. Therefore, a student will most likely not be able to learn how to apply the Methodology by simply reading its procedures. Because Decision Making Methodology is incomplete, its application may call for the design of new procedures. This is a special skill that most students will lack due to inexperience. However, this skill can be fostered through the interaction with an experienced Methodologist. Methodological training provides an opportunity for this interaction. The third reason is that of foundations. Knowing the Methodology's procedures provides a foundation

for utilizing the Methodology in ways other than straight application. Three such ways are dissemination, further development, and testing.

Dissemination involves making the Methodology available to those who need it. If a disseminator knows what "it" is, he/she can disseminate the Methodology more effectively. Further development involves the design of new procedures. If one has an understanding of the existing procedures, then he/she will be in a better position to understand what additional procedures are needed. Testing involves applying the Methodology in a controlled fashion for the purposes of either evaluation or experimentation. Testing obviously implies prior understanding. Thus, training in how to apply the Methodology is provided because it increases the number of persons who can use the Methodology, offers an opportunity for interacting with experienced methodologists for the purpose of learning the procedures of the Methodology as well as learning how to design new procedures; and finally, training lays a foundation for utilizing the Methodology in ways other than straight application.

1.4.1 Plan the application of this step.

The purpose and procedures of this step are essentially the same as the purpose and procedures of sub-step 1.3.1. Both sub-steps involve mapping out the implementation of a particular major step in the Methodology. In sub-step 1.3.1, the dissemination of the Methodology is planned. In this sub-step, the preparation of the methodologist is planned. Since a rationale has already been presented for step 1.3.1, an additional rationale will not be presented here.

1.4.2 Choose the Methodology to be taught.

In this sub-step, the methodology to be taught is chosen. For the purposes of this discussion, it will be assumed that Decision Making Methodology will have been chosen. This selection can be based on the interests and capabilities of a methodologist and/or on the needs of the population that the methodologist is interested in serving. When this step is more fully developed, additional selection criteria will be used.

1.4.3 Develop a current version of the Methodology (refer to step 1.2, Develop a current version of the Methodology).

The extent to which Decision Making Methodology can be applied effectively depends on how complete it is. A complete Methodology is easy to apply because all the procedures necessary for its implementation will have been developed. At this stage of development, Decision Making Methodology is not absolutely complete. However, an absolutely complete Decision Making Methodology can be developed by drafting successive versions, each of which is more complete than the previous versions. This sub-step provides for developing a current, more complete version of the Methodology. This is the version that will be taught to students. In so doing, students will be learning the Methodology in a state of development that is as complete and therefore as effective as possible, given the resources available for development and teaching.

1.4.4 Select the group to whom the Methodology will be taught.

Theoretically, Decision Making Methodology could be taught to anyone who is involved in or effected by the process called decision making. However, a great many people fall into these two categories. Anyone who makes or is effected by decisions is a potential student--a potential methodologist. The Methodology can be taught to everyone who is interested in learning it when there are unlimited resources available for teaching. However, when there are limited resources available for teaching, the Methodology can be taught to only a segment of those who might be interested in this learning. Because the resources available for teaching are usually limited, some students will have to be turned away. Limited resources imply limited teaching. This substep provides procedures by which the methodologist will select the group to whom the Methodology will be taught. Although the selection process is operational, it is by no means rigid. The selection criteria are not predetermined; the identification of selection criteria is a dynamic process. Every time Decision Making Methodology is taught, the teaching methodologist is free to develop his/her own selection criteria. The teaching methodologist is also free to let students choose the selection criteria. Thus, the selection of students is flexible but operationally defined none the less.

1.4.5 Determine the needs of the learning group.

Everyone wishing to apply Decision Making Methodology need not know the same things. Some procedures may be more appropriate than others. The procedures to be taught depend on how the Methodology is to be applied. When Decision Making Methodology is more fully developed, it will have different procedures for dealing with individual decision makers and for dealing with group decision makers. If the student was planning to use the Methodology in a situation in which only groups were involved, then the procedures for dealing with individual decision makers may be inappropriate and possibly should not be taught. At present, Decision Making Methodology has different procedures for dealing with situations in which there are large amounts of resources available for making decisions and for situations in which there are small amounts of resources for making decisions. If the student wished to apply the Methodology in a small resource situation, then that student's learning should be focussed on those procedures that have been developed for those situations. This sub-step provides procedures by which the student identifies the situation in which he/she would like to apply the Methodology. Using this determination, the teaching methodologist will identify what procedures the student needs to learn in order to apply the Methodology in that particular situation. When a student cannot specify the situation in which he/she would like to apply the Methodology, it may not be obvious what procedures he/she should be taught. In this case, all the Methodology's procedures may have to be taught.

1.4.6 Develop a teaching purpose which is specific to the needs of this particular learning group.

In the previous step, the needs of the learning group were identified. In this step, a purpose is drafted that describes how these needs are to be met. The purpose states what the students should be able to do once the preparation program is completed. A purpose must be desirable to the person holding it. If not, the purpose is unacceptable and needs to be revised or discarded. If the purpose around which a preparation program is built is not desirable to the instructors involved, then they might lack the motivation necessary to design and implement the program. If the instructors lack motivation, the preparation program may be doomed to failure because the program may never get off the ground or it may never be completed once it is begun. The teaching purpose describes the "ends" or expected results of teaching. From this purpose, the "means" or the materials and methods necessary for teaching can be logically deduced.

1.4.7 Develop the teaching sequence.

In this step, the operational details of the preparation program are identified. These details specify how the teaching purpose will be accomplished. These details include objectives, strategies for meeting the objectives, and simulations. Simulations are included because the learning of Decision Making Methodology may be better facilitated when the student is given an opportunity to actually use the procedures that he/she is being taught. The situation in which the procedures are used is one that is as similar as possible to the situation in which the

student hopes to apply the Methodology. A simulation provides an opportunity for the student to test his/her skill in a low risk situation. The risk is low because a simulation is not a real application. An operational preparation program will not only provide the instructor with a clear picture of what needs to be done, but it will also permit a detailed critique of the program before it is actually implemented. Once the teaching sequence has been operationally defined, criticism can be focussed on specific activities rather than on general characteristics. Previous sub-steps have provided for critiquing the preparation program at higher levels of abstraction. Two of these levels were the needs that the program is designed to meet and the purpose that describes how these needs are to be met.

1.4.8 Plan the implementation of the teaching sequence.

Once the preparation program has been operationally defined, its implementation needs to be planned. Planning provides an opportunity for identifying and if necessary changing any of the activities in the program that might be difficult to implement. In so doing, some potential problems can be identified and solved before they arise. This substep also provides for developing a decision making strategy that will be used to solve critical problems that may arise as the program is being implemented. This strategy provides the instructor with a process for managing his/her instruction. This management process is a way of solving those problems that could not be anticipated. Finally, planning

provides for allocating the available resources to each activity in the preparation program.

1.4.9 Implement the teaching sequence.

In this sub-step, the Methodology is taught to those who wish to learn it.

1.4.10 Evaluate and redesign if necessary.

The purpose and procedures of this sub-step are essentially the same as the purpose and procedures of sub-step 1.3.8. Both sub-steps involve determining the effectiveness of a particular major step in the Methodology. In sub-step 1.3.8, the effectiveness of the major step "Disseminate the Methodology" was determined. In this sub-step, the effectiveness of the major step "Prepare the methodologist" is determined. Since a rationale has already been presented for sub-step 1.3.8, an additional rationale will not be presented here.

1.4.11 Integrate the newly trained methodologist into a larger system of methodological development.

The field of methodological development is advanced through the professional activities of each of its members. These activities include utilization, development, testing, teaching, and a number of other

options. However, at present, these options are not chosen in any systematic fashion. If there were an operational selection process, then the field of methodological development might be advanced in a way that better serves its clients and its practitioners. This sub-step, the final phase in the preparation of a methodologist, provides a reasonably operational process for selecting the activities by which a newly trained methodologist can most effectively advance the field of methodological development. When this sub-step is more fully developed, it will also include procedures for establishing and maintaining a communication system among methodologists.

This concludes the discussion of the first four major steps of major process number one. Two major steps remain to be discussed. The remaining major steps are 1.5, "Negotiate the decision making contract" and 1.6, "Plan the implementation of the Methodology." As was mentioned in the proposal besides a logical analysis, this study is also to consist of an empirical field test. During the field test, the author will apply the Methodology for a single decision maker. The last two major steps of major process one are more important to this field test of the Methodology than are the first four major steps of that major process.

In major step 1.5, "Negotiate the decision making contract," the scope of the application is described. In that major step, the following factors are decided upon: the length of the contracting period, the resources to be used, the methodology to be used, and the decision makers for whom the methodology is to be applied. Taken collectively, these factors provide the methodologist with an overview of the work that needs to be done. If these factors were not considered, the success of the

application might be threatened because a methodologist would be unaware of the unique characteristics of the application. In step 1.6, "Plan the application of the Methodology," a strategy for applying the Methodology is outlined. This strategy details what sections of the Methodology are to be applied for which decision makers at different points in the contracting period. Having such a plan maximizes the possibility that the Methodology will be applied practically because it minimizes the possibility of conflicts.

Thus, it would be very difficult to apply Decision Making Methodology successfully if major steps 1.5 and 1.6 were not performed. Such is not the case for major steps 1.1 through 1.4. A person experienced in the use of Decision Making Methodology may not need to perform step 1.4, "Prepare the methodologist," prior to an application of the Methodology because the person will already be facile in the use of the Methodology's procedures. The same is true for steps 1.3 and 1.2. In step 1.2, a current version of the Methodology is developed. If the Methodology is reasonably operational and has been found to be reasonably effective, there may be no need to further develop the Methodology prior to an application unless this is the expressed purpose of the methodologist. Step 1.3 provides for the dissemination of the Methodology. Although some of the procedures of that step are found in the client identification section of step 1.5, there is no need to perform step 1.3 in its entirety unless dissemination is the primary interest of the methodologist. Step 1.1 is a cycling mechanism. It refers a reader to those sections of the Methodology that are consistent with the reader's personal desires and professional strengths. In so doing, the reader's

experience with the Methodology is personalized rather than standardized. If the reader is thoroughly familiar with Decision Making Methodology as it has developed to a certain point in time, the reader may be able to proceed directly to the appropriate sections of the Methodology, bypassing step 1.1. In most cases, a person about to apply the Methodology will have been well versed in either its procedures or in the procedures of methodologies similar to it. In such cases, the implementation of step 1.1 may not be needed prior to applying the Methodology.

Because of the unique importance of steps 1.5 and 1.6, they will be discussed in slightly greater detail than steps 1.1 through 1.4. The discussion of steps 1.1 through 1.4 was primarily concerned with the logic of the sub-steps that have been developed to implement these major steps. In discussing steps 1.5 and 1.6, the specific procedures that have been developed to implement a specific sub-step will be presented in addition to the logic of the sub-steps themselves.

1.5 Negotiate the decision making contract.

Each application of Decision Making Methodology is unique. Different decision makers have different amounts and types of resources for solving different types of problems. Decision making cannot be performed successfully unless the unique differences of each particular application are known and are taken into account as the Methodology is being applied. Decision makers must be identified so that the methodologist will know who to apply the Methodology for. A decision maker's resources must be known so that the methodologist can determine how complex the application

can be. This step provides for identifying both the decision makers and the resources that these decision makers are willing to devote to an application of Decision Making Methodology. Once this information is obtained, it is organized into a contract statement that is acceptable and understandable to both methodologist and decision maker. This contract provides the methodologist with an overview of the work that needs to be done.

The contract also clearly delineates the responsibilities of both methodologist and decision maker. The decision maker is responsible for providing, if possible, the resources that he/she has stated will be available for the application. The decision maker is also responsible for working closely and honestly with the methodologist during the application. The methodologist is responsible for applying the Methodology as completely and as effectively as possible, given the available resources. The methodologist is also responsible for protecting the decision maker in his/her decision making role. The methodologist is not to coerce the decision maker into making any decisions that would not be in the decision maker's best interests as those interests are defined by the decision maker. The Methodology cannot prevent coercion. However, the contract provides the decision maker with the option of halting the application if he/she feels that coercion is in fact going on.

1.5.1 Plan the implementation of the step.

The purpose and procedures of this sub-step are essentially the same as the purpose and procedures of 1.4.1. Both sub-steps involve

mapping out the implementation of a particular major step in the Methodology. In sub-step 1.4.1, the preparation of a methodologist is mapped out. In this sub-step, the negotiation of a decision making contract, is mapped out. Since a rationale for sub-step 1.4.1 has already been presented, an additional rationale will not be presented here.

1.5.2 Develop a list of potential clients.

A decision making contract cannot be negotiated without a client. This sub-step provides for compiling a list of potential clients for whom the Methodology might be applied. From this list, the most appropriate client will be chosen.

1.5.2.1 Identify all those who have needs which the Methodology may meet. At this point, the methodologist may want to refer to parts of step 1.3, "Disseminate the Methodology," especially 1.3.3, "Define the class of problems that the Methodology solves," and 1.3.4, "Develop a list of potential utilizers," in order to develop additional rules and procedures for the identification of potential clients.

1.5.2.2 Identify all those who have actively sought out the methodologist for the purpose of having the Methodology applied.

1.5.2.3 Identify all those who have been referred to the methodologist as potential clients.

1.5.2.4 Combine all the above lists into a single list of potential clients.

1.5.3 Test the list of clients for completeness.

The purpose and procedures of this sub-step are essentially the same as the purpose and procedures of sub-step 1.2.5. Both involve presenting the decision maker with additional information that may point up changes the decision maker may want to make in what has already been done. In sub-step 1.2.5, the decision maker is provided with an additional list of gaps which he may consider in deciding what improvements are to be made in the Methodology. In this sub-step, it is provided with an additional list of clients that may want the Methodology applied. Because a rationale for sub-step 1.2.5 has already been presented, an additional rationale will not be presented here.

1.5.3.1 Repeat the dissemination process in part or in full.

1.5.3.2 Consult those for whom the Methodology has been applied in the past in order to identify potential clients.

1.5.3.3 Have other methodologists in the same area identify potential clients.

1.5.3.4 Determine if the Methodology can logically proceed or follow the application of any other methodology and then consult with those for whom these "other" methodologies have been applied in order to identify potential clients.

1.5.3.5 Consult methodologists in other areas.

1.5.3.6 Perform any other appropriate test(s) of completeness.

1.5.3.7 Develop a single list of potential clients.

1.5.4 Develop a list of criteria on which to choose the most appropriate client(s).

Some decision makers may be more appropriate clients than others. However, appropriate decision makers cannot be identified in the absence of some set of selection criteria. Appropriateness is defined from the perspective of the person applying the Methodology--i.e., the methodologist. For example, a methodologist may want to apply the Methodology for a certain type of decision maker such as principals of alternative schools. Another example would be a methodologist only wanting to apply the Methodology for decision makers who have had certain types of experiences or who possess certain types of knowledge, such as those who have worked in computer technology. This sub-step provides procedures by which the methodologist can generate the necessary selection criteria.

1.5.4.1 Operationally define the concept "A completely successful application of Decision Making Methodology.

1.5.5 Test the list of criteria for completeness.

A rationale for testing the completeness of a given list of items has already been presented.

1.5.5.1 Review all successful and unsuccessful applications of the Methodology.

1.5.5.2 Review the rationale for the Methodology's development.

1.5.5.3 Review the most current version of the Methodology.

1.5.5.4 Review the product definition of the Methodology's purpose.

1.5.5.5 Have other methodologists define the concept.

1.5.5.6 Have other methodologists perform the tests of completeness.

1.5.5.7 Develop a list of concepts that are critical to the successful implementation of any methodology. Refer to steps 1.3.5.1, 1.3.5.2, and 1.3.5.3.

1.5.6 Choose the most appropriate client(s).

At this point, the methodologist has a list of selection criteria and a list of decision makers for whom the Methodology might be applied. In this sub-step, the methodologist will select the decision maker(s) for whom he/she will apply the Methodology. Although no procedures have been developed for the implementation of this sub-step when such procedures are developed, they will provide a process for measuring each potential client against the most critical selection criteria.

1.5.7 Develop a contract statement.

Once an appropriate decision maker has been chosen, the scope of the work needs to be defined. This definition is not developed all at once; it is developed gradually. Developing a contract statement is the first step. Developing an operational plan for implementing the Methodology completes the defining process. An operational plan for implementing

the Methodology will be developed in the next major step, 1.6, "Plan the implementation of the Methodology." In this sub-step, a contract statement is developed that provides the methodologist with a broad overview of the work to be performed. The specifics of the job come from the decision maker. Thus, the contract statement protects the interests of the decision maker by having him/her, and not the methodologist or any other outside agent, identify the parameters of the job to be performed.

The contract statement should include the following information:

1.5.7.1 The name of the contract decision maker.

1.5.7.2 The area(s) of concern where the Methodology will be applied.

1.5.7.3 The decision makers for whom the Methodology will be applied. Decision makers should be those individuals who have primary responsibility for meeting needs within the chosen area of concern.

1.5.7.4 The resources to be utilized.

1.5.7.5 The Methodology to be employed.

1.5.7.6 The time period within which the work will be done.

1.5.8 Evaluate.

The purpose and procedures of this sub-step are essentially the same as the purpose and procedures of sub-step 1.4.10. Both sub-steps involve determining the effectiveness of a particular major step in the Methodology. In sub-step 1.4.10, the effectiveness of the major step "Prepare the methodologist" was determined. In this sub-step, the

effectiveness of the major step "Negotiate a decision making contract" is determined. Since a rationale has already been presented for sub-step 1.4.10, an additional rationale will not be presented here.

1.6 Plan this application of the Methodology.

Planning is provided for so that Decision Making Methodology can be applied practically. Decision Making Methodology is a very complex set of procedures. Decision makers differ in the types and amounts of resources that they are willing to devote to an application of these procedures. Successful application requires that the Methodology's procedures be implemented as completely and as effectively as possible, given the available resources. This major step not only provides for identifying those procedures that are practical, given the available resources, but it also provides for developing a management process by which the chosen procedures can be modified if they are observed to be working poorly during actual implementation.

1.6.1 Create an "application matrix."

The long form of Decision Making Methodology is a complex set of procedures for making decisions in large resource situations. Many of these situations will call for the Methodology to be applied for more than one decision maker. Planning an application of the long form involves identifying both the decision makers and the procedures that are

to be used for each. The decision makers for whom the Methodology is to be applied are identified by using the procedures of the previous step, 1.5, "Negotiate the Decision Making Contract." In this sub-step, the procedures to be used in applying the Methodology for each decision maker are organized into a single application matrix. The matrix is not fully operational because it is not absolutely complete. The matrix could not be absolutely complete unless there were unlimited resources for its creation. Usually the resources for creating the matrix will be limited and for this reason the completeness of the matrix will also be limited. As incomplete as it is, however, the matrix still provides a much more detailed description of the work to be performed than was provided in the initial contract. As the work to be performed is described in greater detail, not only will the methodologist have a more comprehensive understanding of what needs to be done, but the decision maker will also have a clearer understanding of what should and should not be expected.

1.6.1.1 Along the top of the matrix, place the names of all the decision makers involved in this application.

DM #1, DM #2, DM #3, DM #n →

1.6.1.2 Along the side of the matrix, place the names of each major process of the Methodology:

1 ↓ identify problems

2 ↓ state purpose

3 ↓ conceptualizing the ideal solution

n ↓

The completed skeleton should look like this:

	DM #1	DM #2	DM #n
Process #1			
Process #2			
Process #n			

1.6.1.3 Develop each cell of the matrix by reviewing the most recent version of the Methodology to determine what set of procedures is most appropriate for that decision maker to accomplish the purpose of that process.

1.6.1.4 Review the activities developed for each cell.

1.6.1.5 Arrange the activities in each cell in a chronological order.

1.6.2 Arrange the activities of all cells into a single chronological order, allocate resources and schedule the times and dates when each activity will be carried out. These plans are preliminary and may be changed as a result of the following step.

Planning requires knowing what to do and when to do it. Although an application matrix specifies what procedures are to be used with each decision maker for whom the Methodology is to be applied, the matrix does not specify at what times during the contracting period each of these procedures are to be implemented. The matrix provides the what without specifying the when. Before the Methodology can be applied, the

methodologist must know the decision maker's periods of availability. Using this information, the methodologist can determine the overall sequence of implementation. This sequence will specify when each of the planned procedures are to be carried out. This sub-step provides for developing the overall sequence of implementation.

1.6.3 Plan for decision making.

Modern decision making theory recognizes that man has limited resources for solving the problems that confront him. Having limited resources means that man is not capable of designing ideal solutions but is capable of designing feasible solutions. Ideal solutions are solutions that are designed in situations where unlimited resources are available. Feasible solutions are those that are designed in situations where there are limited resources. One of the aspects of an ideal solution is that its implementation is problem free. This is possible because with unlimited resources, every possible implementation problem could be identified and worked out prior to implementation. One of the aspects of a feasible solution is that some problems will most likely arise during its implementation. This happens because with limited resources, some implementation problems cannot be identified and worked out prior to implementation. It is possible that critical problems, problems that may cause the solution to fail, may go undetected. Therefore, it is important that feasible solutions contain a process for identifying and solving any critical problems that may arise during implementation. Decision Making Methodology is a solution to the problem of decision making. Unlimited resources

were not available for the development of the Methodology. Therefore, the Methodology is a feasible rather than an ideal solution to the problem of decision making. Because the Methodology is not ideal, at least not at this stage of its development, its implementation cannot be expected to be problem free. In this sub-step, a strategy is developed for identifying and solving critical problems that may arise during an application of the Methodology. In other words, this sub-step provides for developing a process for managing the application. In this version of the long form of Decision Making Methodology, critical implementation problems are identified from the perspective of the decision maker. If a decision maker determines that something very important that he or she wanted to see happen during the application is in fact not happening, then a critical problem is assumed to exist. When this sub-step is more fully developed, additional perspectives will be used to identify critical implementation problems. These additional perspectives might include those of the methodologist or those of the people who are being directly effected by the decisions that are being made using the Methodology.

1.6.3.1 Identify decision makers.

1.6.3.2 Identify decisions to be made by the decision makers.

1.6.3.3 Determine when the decisions are going to be made.

1.6.3.4 Identify/develop the activities which, when observed, will provide the data needed to make the necessary decisions.

1.6.3.5 Develop plans for observing the activities.

1.6.3.6 Develop plans for reporting the data through observation.

1.6.3.7 Design the process to be used in decision making.

1.6.3.8 Review the decision making process.

1.6.3.9 Integrate the plans for observation, plans for reporting and the process for decision making into a cohesive plan for decision making.

1.6.4 Test the plan for decision making by constructing data which indicate satisfactory, unsatisfactory and grossly deficient performance of an activity and then apply the decision making process to make decisions, given the data.

When possible, the management process that was developed in the previous sub-step should be tested. The results of testing will indicate how effective the process is. A defective management process needs to be redesigned. If not, the effectiveness of a particular application of Decision Making Methodology might be unnecessarily limited. This limitation would be due to the fact that critical implementation problems, should they arise, may go unsolved because the process that was developed for their identification and solution was inadequate.

1.6.5 Integrate the tested plan for decision making into the preliminary schedule of activities (1.6.2) making any needed adjustments in the allocation of resources or the scheduling of activities.

One of the advantages of having a management process is that it allows for ongoing modification of the procedures that have been planned

for a given application. Ongoing modification is not possible unless the planned procedures and the process for managing them are implemented in an integrated fashion. Management consists of observation and corrective action. The planned procedures should be observed as they are being implemented or as soon after implementation as possible. If observation indicates that a planned procedure is not working well, then appropriate corrective action can be taken then and there rather than waiting until the application is completed. The integration of planned procedures and management process is one way of assuring that if problems do arise during implementation, they will be addressed as rapidly as possible.

1.6.6 Evaluate.

A rationale for sub-steps equivalent to this one has already been presented.

Rationale for the Major Steps of Major Process 2.0: Perform a Needs Analysis

The second major process of Decision Making Methodology is "Perform a Needs Analysis." This major process consists of the following seven major steps.

2.1 Plan the implementation of this step.

2.2 Determine the needs which are of concern to the decision maker.

2.3 Define the needs which the decision maker is interested in meeting.

2.4 Report the definition of the need to the decision maker.

2.5 Measure the degree to which the definition of the need is being met.

2.6 Report the results of the measurement to the decision maker.

2.7 Evaluate.

At this point, a rationale will be presented for each of the above major steps.

2.1 Plan the implementation of this step.

A rationale for steps equivalent to this step has already been presented.

2.2 Determine the needs which are of concern to the decision maker.

The following statement is the crux of needs analysis "Who needs what according to whom." The who are the needers or those people who have needs that the decision maker is interested in meeting. The what are the kinds of needs or the particular conditions that the decision maker is interested in improving. The whom are the definers or those who can operationally describe the need in terms that are relevant to the decision maker. People have needs; inanimate objects do not. Needs are identified so that the analysis can have focus. Needs must be defined so that measurement can be undertaken. The who defines the target

population. Definers also make measurement possible. They remove the ambiguity that is normally encountered in needs analysis work. In this step, the decision maker identifies needs, needers and definers. Using this information, the methodologist then composes a list of need statements in the form of "Who needs what according to whom." Finally, the decision maker will put in order the need statements that make sense to him/her. These statements contain the needs that will be defined and measured in the upcoming steps.

2.3 Define the need which the decision maker is interested in meeting.

Needs are usually stated ambiguously. Ambiguous need statements are not only difficult to measure but they also hinder rather than help the person who is interested in meeting the need. If a need is not stated explicitly, there will be no clear indication of what must be done to fulfill it. The chance that a decision maker will design a solution that really does not meet the need is increased when the decision maker is unsure as to what the need means. If a solution does not meet the need it was designed to meet, then the solution may be considered irrelevant or, at best, of limited utility. The resources consumed in the design of such a solution can be considered wasted. A need can mean as many different things as there are different interpreters of the need's meaning. Only a few interpretations will be valid for a particular decision maker. A valid interpretation is one that is equivalent to the decision maker's own interpretation. In this step, an ambiguous need is

divided into its observable particulars. It is in this sense that it is interpreted; it is in this sense that it is defined. In the previous step, the decision maker chooses the person who is to do the defining. This choice was made on the basis of the definer's ability to produce a definition that is relevant to the decision maker. So defined a need is more clearly understood and more measurable. The decision maker may or may not do the defining him/herself.

2.4 Report the definition of the need to the decision maker.

In this step, both the process and the results of defining a particular need are reported to the decision maker. The process of defining consists of the procedures used as well as any problems that were encountered as these procedures were being implemented. The results of defining consist of a definer's operational definition of a particular need. Understanding the definition process helps the decision maker avoid putting too much or too little emphasis on the results of defining because he/she will understand the process by which the results were produced. This understanding should minimize unrealistic expectations of what the definition should have consisted. By presenting the definer's definition, the decision maker is made aware of some of the need components that can be measured in the upcoming step. The definer's definition does not contain all possible components of the particular need because of definer bias and also because of limited resources.

2.5 Measure the degree to which the definition of the need is being met.

One way in which a decision maker can determine the importance of a given need component is to consider its present state of fulfillment. A decision maker may be interested in meeting a component that is largely unfulfilled. This step provides for identifying those components that a decision maker is most concerned about meeting and then measuring the extent to which the chosen components are already fulfilled.

2.6 Report the results of the measurement to the decision maker.

In this step, both the process and the results of measurement are reported to the decision maker. The measurement process consists of the procedures used as well as any problems that were encountered as these procedures were being implemented. The results of measurement consist of a quantified description of the degree to which a particular need is presently being met. Understanding the measurement process helps the decision maker avoid putting too little or too much emphasis on the results of measurement because he/she will understand the process by which the results were produced. This understanding should minimize unrealistic expectations concerning what the results should have been. By presenting the degree to which a particular need is presently fulfilled, the decision maker is provided information that will help him/her to choose those needs

that he/she would like the Methodology applied to meet. A decision maker may choose to meet those needs that are presently unmet.

2.7 Evaluate.

A rationale for steps equivalent to this step has already been presented.

Rationale for the Major Steps of Major Process 3.0: Develop a Purpose Statement

The third major process of Decision Making Methodology is "Develop a Statement of the Purpose." This major process consists of the following nine major steps.

3.1 Plan the implementation of this step.

3.2 Choose what components of what needs are to be met using the Methodology.

3.3 Develop an additional application matrix if more than one distinct need component has been chosen.

3.4 Determine what is presently known about meeting the need.

3.5 Choose a piece of the need if it turns out to be too complex to meet as a single unit.

3.6 Create a list of purposes that validly express the decision maker's intentions for meeting the chosen need.

3.7 Choose the most appropriate purpose.

3.8 Test the chosen purpose.

3.9 Evaluate.

At this point, a rationale will be presented for each of the above major steps.

3.1 Plan the implementation of this step.

3.2 The decision maker chooses what component(s) of what need(s) are to be met using the Methodology.

Each component of each need represents a potential problem to which the Methodology could be applied. In this step, the decision maker chooses the problems to be solved. This choice is made on the basis of such criteria as importance to the decision maker and the degree to which measurement indicates that the problem is already solved. It should be stressed that the decision maker and not the methodologist chooses the problems to be solved. This is done so that the operational details of a given application of the Methodology will come from the decision maker and not from any outside agent. In so doing, the decision maker is protected in his/her decision making role.

3.3 If the decision maker chooses to meet a set of need components that cannot be logically combined into a single purpose statement, then a separate application matrix is made for this decision maker. The only change in the matrix will be in the labelling of the horizontal axis (1.6.1.2). Instead of containing the names of decision makers, it will contain the names of the need components to be met.

It is logical to assume that a decision maker with a large amount of resources (greater than twenty five hours, for example) available for making decisions in a particular problem area may want to solve more than one problem from within the problem area. Applying the Methodology for such a decision maker is much more complex than applying the Methodology for a decision maker who has chosen to solve only a single problem. When a decision maker wants to solve multiple problems, additional planning will be necessary. The additional planning involves providing for developing separate solutions for each separate problem. If these additional plans were not developed, the application of the Methodology could very easily become hopelessly entangled. In this step, provisions are made for developing separate solutions to each separate problem that the decision maker has chosen to solve. These problems are specific procedures from within the Methodology. These procedures are integrated into an application matrix that is specific to the decision maker who is interested in solving multiple problems.

3.4 The decision maker determines what is presently known about the need which is to be met.

Modern decision making theory acknowledges that decision makers have limited resources available for solving the problems that confront them. The effectiveness of a decision is increased when the resources available for formulating the decision are increased. One of the most critical resources available to a decision maker is that of knowledge. Knowledge is critical because if a decision maker chooses to solve a

problem in a way that is inconsistent with what is already known about solving the problem, then the solution may have negative side effects or may fail altogether. Thus, knowledge helps a decision maker orientate the design of a solution along more rather than less productive lines. This step does not attempt to provide the decision maker with every bit of information that has been amassed about solving his/her problem. What this step does do is provide the decision maker with as much relevant information as possible, given the available resources.

3.4.1 Read literature which relates to the need.

3.4.2 Talking to people whose work is involved in meeting the need.

3.4.3 Examine actual efforts to meet the need.

3.4.4 Talk to people who are or have been effected or served by efforts to meet the need.

3.4.5 Talk to people who at one time were involved in meeting the need but who have discontinued their involvement.

3.4.6 Think about the need.

3.4.7 Try out tools that already exist for meeting the need.

3.5 If the above analysis indicates that the chosen need represents a very complex problem area, then choose a piece of the original need and repeat the previous step for the chosen piece.

As a decision maker's knowledge is increased, he/she may realize that the problem is more complex than was originally thought. In this case, the problem may have to be subdivided. Each separate piece is then viewed as a sub-problem. This step provides for choosing a sub-problem when the original problem is too complex to be dealt with as a single unit. This step also provides for determining what is known about the sub-problem.

3.6 Create a list of purposes that validly express the decision maker's intentions for meeting the chosen need.

A decision maker may have more than one idea of how to solve a problem. Each separate idea may be considered as a separate purpose. This step provides for creating a list of purposes that are relevant to the decision maker.

3.7 Choose the most appropriate purpose.

This step provides for choosing the purpose that is most relevant to the decision maker.

3.8 Test the chosen purpose.

Not every purpose warrants the design of a solution to accomplish it. The wording of some purposes may contain inherent obstacles to the

design, implementation or evaluation of a solution. Before a solution is designed, the purpose must meet certain criteria. These criteria assure that a solution can and should be designed. Two of these criteria are clarity and significance. If a purpose is unclear, a solution for accomplishing it will be very difficult to design. A fuzzy purpose complicates the design process. If a purpose is insignificant and does not require a specific type of solution, then a solution for accomplishing it should not be designed. Testing the purpose against such criteria is one way of assuring that the resources remaining for the design and implementation of a solution will be used as effectively and efficiently as possible.

3.8.1 Can the chosen purpose be expanded to include other unfilled needs? If so, expand; if not, proceed.

3.8.2 Is the purpose trivial? Is it clear that the purpose as stated requires a specific solution? Does the purpose contain sufficient qualifiers (nouns, adjectives, adverbs, phrases, and clauses). If the purpose is trivial, revise it until it isn't.

3.8.3 If the purpose is accomplished, will it meet the need? If not, revise it until it does.

3.8.4 Is the decision maker committed to accomplishing this purpose? If not, develop a purpose which will carry the commitment of the decision maker.

3.8.5 Is the purpose ethical?

3.8.6 Is the purpose desirable? Will a solution to accomplish

this purpose be actually used? If the purpose is not desirable, revise it until it is.

3.8.7 Is the purpose definable? Can it be described in terms of directly observable behaviors or states? If not, revise it until it is definable.

3.8.8 Is the purpose practical? Can it be accomplished within the available resources? If not, revise it until it is practical.

3.8.9 Are existing solutions insufficient? Do any solutions exist that can accomplish the purpose? If there are either, revise the purpose or adopt the existing solution.

3.8.10 If any of the above tests have resulted in a changed purpose, then that purpose should be taken through all other tests separately.

3.8.11 Have other people perform any or all of the above tests.

3.8.12 Write out the acceptable purpose.

3.9 Evaluate.

Rationale for the Major Steps of Major Process 4.0: Conceptualize the Ideal Solution

The fourth major process of Decision Making Methodology is "Conceptualize the Ideal Solution." This major process consists of the following eight major steps.

4.1 Plan the implementation of this step.

4.2 Develop a preliminary list of ideal solutions.

4.3 Develop a list of usual solutions.

4.4 Develop a final list of ideal solutions.

4.5 Choose the most appropriate ideal solution.

4.6 Review the chosen ideal solution.

4.7 Confirm the ideal solution with the appropriate individuals or groups based on law or policy.

4.8 Evaluate.

At this point, a rationale will be presented for each of the above major steps.

4.1 Plan the implementation of this step.

4.2 Develop a preliminary list of ideal solutions.

The term ideal solution means different things to different decision makers. For some decision makers, an ideal solution is one that uses as little resources as possible. For other decision makers, an ideal solution is one that has been designed for situations in which there are unlimited resources. It is important that the definition used be valid for the decision maker. If not, the reason for conceptualizing an ideal solution in the first place will have geen defeated. An ideal solution is a target. Ideal solutions are very rarely implemented.

However, the Methodology provides for modeling the solution that will be implemented after the ideal solution. The solution to be implemented is called the feasible solution. The feasible solution should be as close as possible to the ideal solution. During the design and implementation of the feasible solution, a constant effort is made to make the feasible solution and the ideal solution as similar as possible. The decision maker will most likely not cooperate in this effort if the ideal solution itself is not relevant to the decision maker. The ideal solution will not be relevant unless the definition of the term "ideal solution" is also relevant. This step provides for developing a definition of the concept of an ideal solution that is relevant to the decision maker. Not only are there many different definitions of the term "ideal solution," but there are also many solutions that could fulfill any given definition. Many solutions could solve a problem and use very little resources in the process if an ideal solution is defined as one which utilizes very little resources. Many solutions could be devised to solve a problem when there are unlimited resources available if an ideal solution is defined as one which operates in a situation of unlimited resources. Therefore, this step also provides for generating solutions that are consistent with the decision maker's definition of an ideal solution.

4.2.1 Define the term "ideal solution."

4.2.2 Develop a list of solutions consistent with the definition.

4.3 Develop a list of usual solutions.

A usual solution is one that is feasible rather than ideal. However, a usual solution can be made ideal by modifying it in light of a decision maker's definition of an ideal solution. If a decision maker believes that an ideal solution is one that utilizes as little resources as possible, then a usual solution can be made ideal by modifying it so that it utilizes a minimal amount of one resource or another. If a decision maker believes that an ideal solution is one that is designed for a situation in which unlimited resources are available, then a usual solution can be made ideal by modifying it so that it utilizes a maximal amount of one resource or another. By developing a set of usual solutions, a decision maker is provided with the basis for expanding his/her original list of ideal solutions.

4.3.1 Develop a list of usual solutions for this purpose.

4.3.2 Develop a list of usual solutions to similar purposes or problems.

4.3.3 Develop a list of solutions to problems that have nothing to do with the original problem.

4.3.4 Combine all the above lists (4.3.1.6, 4.3.2.5 and 4.3.3.7) into a single list of usual solutions.

4.4 Develop a final list of ideal solutions.

In this step, each usual solution is modified in light of the decision maker's definition of an ideal solution. These usual solutions made ideal are then added to the original list of ideal solutions. The results of this step represent a reasonably complete list of ideal solutions.

4.4.1 Examine each usual solution in the light of the definition of an ideal solution.

4.4.2 Change each usual solution so that it is consistent with the definition of an ideal solution.

4.4.3 Combine the results from above with the preliminary list of ideal solutions (4.2.2.6).

4.4.4 Test the above list for completeness using systems logic and any other appropriate test of completeness.

4.5 Choose the most appropriate ideal solution.

All ideal solutions are not equally effective. Were they all to be implemented, they would each solve the decision maker's problem to different degrees. The purpose of this step is to identify the ideal solution that most completely solves the decision maker's problem. A decision maker's desires are used as the basis for generating selection

criteria. This is done because the purpose of the Methodology is "to make decisions that are optimal with respect to the desires of a decision maker." This purpose implies that the selection criteria come from the decision maker and not from someone else. The selection is made by testing each of the ideal solutions against each of the decision maker's criteria. The complexity of testing depends on the available resources. With unlimited resources, each of the ideal solutions could actually be implemented. However, resources are usually limited. With limited resources, less elaborate testing procedures are employed.

4.5.1 Develop the criteria on which the selection will be made.

4.5.2 Choose the alternatives to be tested.

4.5.3 Prepare the chosen alternatives for testing.

4.5.4 Choose the activities to be tested.

4.5.5 Plan for testing.

4.5.6 Implement the plan for testing.

4.5.7 Evaluate.

4.6 Review the chosen ideal solution.

It has already been mentioned that the function of an ideal solution is to serve as a target for the design of a feasible solution. However, a feasible solution may not be possible or worthwhile to design. The design of a feasible solution will not be possible if the ideal

solution is not clearly delineated. Designing a feasible solution revolves around identifying and changing an ideal solution's impractical aspects. If the ideal is "fuzzy", its impractical aspects may not be readily observable. Impractical aspects cannot be changed when they cannot be identified. The design of a feasible solution may not be worthwhile if the ideal solution has serious imperfections. An ideal solution that is internally or externally inconsistent may be considered to have serious imperfections. An ideal solution that is internally inconsistent would be difficult to implement because there would be a conflict among its parts. An ideal solution which is externally inconsistent would be difficult to implement because there would be a conflict between itself and the environment in which it is to be carried out. If these defects are not changed, they may be incorporated into the feasible solution because the feasible solution is supposed to be as similar to the ideal solution as possible. This step provides for determining if the ideal is clear and both internally and externally consistent. If the ideal does not meet these criteria, it will be modified until it does.

4.6.1 Inspect the solution to determine if it is developed sufficiently enough so that it can be modified in light of resources that are actually available for its implementation. Such modification would make the ideal solution a feasible solution. If the ideal is not sufficiently developed, then repeat steps 4.5.3.1 and 4.5.3.2.1 at this time. If the ideal is sufficiently developed, simply move on.

4.6.2 Examine the internal consistency of the ideal.

4.6.3 Examine the external consistency of the ideal.

4.7 Confirm the ideal solution with the appropriate individuals or groups based on law or policy.

Decision makers do not operate in a vacuum. Their decisions effect their surroundings. However, a decision maker is usually less than completely aware of his/her total environment. Rarely will the decision maker be conscious of all the activities that are going on around him/her. This limitation prohibits the decision maker from anticipating all the effects of implementing the solution. Some of these unanticipated effects could be very negative. This step provides for presenting the ideal solution to those who have a more comprehensive understanding of the decision maker's environment. Possible negative effects of the solution may be more easily identified by these people than by the decision maker. These are people to whom the decision maker normally reports or with whom he/she consults. When this step is more fully developed, it will provide for controlling the negative effects of the solution and/or changing those aspects of the solution that are responsible for generating the negative effects. In either case, the action to be taken, either controlling the negative effects or changing those solution activities that generate the negative effects, would be chosen by the decision maker.

4.8 Evaluate.

Rationale for the Major Steps of Major Process 5.0:
Design the Actual Solution

The fifth major process of Decision Making Methodology is "Design the Actual Solution." This major process consists of the following ten major steps.

5.1 Plan the implementation of this step.

5.2 Arrange the parts of the ideal solution into the order in which they will be worked on.

5.3 For the first/next part, state the part's purpose.

5.4 Identify the resources that are actually available to implement this part.

5.5 Develop feasible alternatives to the ideal part.

5.6 Choose the most appropriate feasible alternative.

5.7 Repeat the above steps until there is a feasible alternative to each part of the ideal solution.

5.8 Review the feasible solution.

5.9 Confirm the feasible solution with the appropriate individuals or groups based on law or policy.

5.10 Evaluate.

At this point, a rationale will be presented for each of the above major steps.

5.1 Plan the implementation of this step.

5.2 Arrange the parts of the ideal solution into the order in which they will be worked on.

Designing a feasible solution involves developing an alternative to each part of the ideal solution. Each part designed should be feasible rather than ideal. The design process can be very complicated due to the fact that ideal solutions are usually composed of more than one part. Each ideal part represents a separate design task. In order to avoid confusion and the possible waste of resources, alternatives are designed for one part at a time. In this step, the parts of the ideal solution are arranged in the order by which feasible alternatives will be designed for them.

5.3 For the first (next) part, state the part's purpose.

Not only does the ideal solution have a purpose, but each of its component parts also have a purpose. The accomplishment of the purpose of each part enables the accomplishment of the overall purpose of the solution itself. Because a part's purpose describes what the part is supposed to do, the purpose may serve as a guide for the generation of alternative parts. Only alternatives that accomplish the part's purpose

should be considered. This step provides for identifying a part's purpose. In subsequent steps, this purpose will be used to generate alternative parts.

5.4 Identify the resources that are actually available to implement this part.

The issue of resources is a critical difference between an ideal and a feasible solution. There are limited rather than unlimited resources available for the implementation of a feasible solution. This implies that resource constraints should be considered in the design of feasible solutions. In this step, resource constraints are identified. In subsequent steps, these same resource constraints are used as parameters for the design of a feasible solution.

5.5 Develop feasible alternatives to the ideal part.

The purpose and procedures of this step are essentially the same as the purpose and procedures of step 4.3. In step 4.3, usual solutions are designed. In this step, feasible solutions are designed. Feasible solutions and usual solutions are essentially the same. Both feasible and ideal solutions are consistent with the available resources. Because a rationale for step 4.3 has already been presented, an additional rationale will not be presented here.

5.5.1 Write down all the things that you would need to accomplish the purpose of the part.

5.5.2 Write down all the things that if you did not have might cause you to fail to accomplish the purpose of the part.

5.5.3 Write down all the things that you would be actually using if you were accomplishing the part's purpose.

5.5.4 Write down all the unusual things that you might use to accomplish the purpose of the part.

5.5.5 Write down all those things that have nothing to do with your accomplishing the purpose of the part.

5.5.6 Test the above list for completeness.

5.5.7 Review each alternative developed above in light of the resources actually available to make sure that the alternative is feasible.

5.6 Choose the most appropriate feasible alternative. (Refer to step 4.5.)

The purpose and procedures of this step are essentially the same as the purpose and procedures of step 4.5. Both steps involve using the desires of a decision maker to choose either the most appropriate ideal solution, as is done in step 4.5, or the most appropriate feasible solution, as is done in this step. Because a rationale for step 4.5 has already been presented, an additional rationale will not be presented here.

5.6.1 Develop the criteria on which the selection will be made (4.5.1).

5.6.2 Choose the alternatives to be tested (4.5.2).

5.6.3 Prepare the alternatives chosen for testing by developing the activities of each alternative part (4.5.3.2.2).

5.6.4 Choose the activities to be tested (4.5.4).

5.6.5 Plan for testing (4.5.5).

5.6.6 Implement the plan for testing (4.5.6).

5.6.7 Evaluate (4.5.8).

5.7 Repeat the above steps until there is a feasible alternative to each part of the ideal solution.

This step provides for recycling the decision maker back through the two previous steps until a feasible alternative has been designed for each part of the ideal solution. This is done so that all essential parts of the ideal solution have feasible alternatives designed for them. If this were not done, the feasible solution would be incomplete and for this reason may fail when it is actually implemented.

5.8 Review the feasible solution.

In this step, the feasible solution is examined to make sure that there is no conflict among its parts or within its parts and between the whole solution and the environment in which it will be implemented. This is done in order to identify characteristics of the solution that might make it difficult to implement. When this step is more fully developed, it will provide for resolving any serious internal or external conflict that might be uncovered.

5.8.1 Examine the internal consistency (4.6.2).

5.8.2 Examine the external consistency (4.6.3).

5.9 Confirm the feasible solution with the appropriate individuals or groups based on law or policy.

The purpose and procedures of this step are essentially the same as the purpose and procedures of step 4.7. Both steps involve having others who possess a more comprehensive understanding of the decision maker's environment review the solution in order to identify any possible negative effects that may result from the solution's implementation. Because a rationale for step 4.7 has already been presented, an additional rationale will not be presented here.

5.10 Evaluate.

Rationale for the Major Steps of Major Process 6.0: Plan the Implementation of the Solution

The sixth major process of Decision Making Methodology is "Plan the Implementation of the Solution." This major process consists of the following nine major steps.

6.1 Plan the implementation of this step.

6.2 Arrange the parts of the feasible solution into the order in which they will be worked on.

6.3 Choose the first/next part to be worked on.

6.4 Develop the activities which are necessary for the part to accomplish its purpose.

6.5 Review the activities.

6.6 Develop the activities which are necessary for the solution to accomplish its purpose.

6.7 Allocate resources to the activities and confirm the allocation. Make any needed changes in the allocation.

6.8 Plan the decision making.

6.9 Evaluate.

At this point, a rationale will be presented for each of the above major steps.

6.1 Plan the implementation of this step.

6.2 Arrange the parts of the feasible solution into the order in which they will be worked on.

The purpose and procedures of this step are essentially the same as the purpose and procedures of step 5.2. In step 5.2, parts of the ideal solution were sequenced so that a feasible alternative could be designed for each part. In this step, the parts of a feasible solution are sequenced so that the activities necessary to implement each part can be developed. Thus, both steps involve sequencing the parts of a solution so that further design can be undertaken. Because a rationale for step 5.2 has already been presented, an additional rationale will not be presented here.

6.3 Choose the first (next) part to be worked on.

In this step, the decision maker chooses the feasible part for which he/she would like to design implementation activities at this time.

6.4 Develop the activities which are necessary for the part to accomplish its purpose.

The success of a feasible solution is dependent in part upon the successful implementation of its component parts. If a part fails, the solution may also fail. The purpose of this step is to develop a

reasonably complete list of activities for implementing a particular part of the feasible solution. Viewed collectively, these activities represent a set of instructions. These instructions are designed to minimize the guess work that may be involved in the implementation of a particular part. However, this list of activities does not guarantee problem free implementation. Problem free implementation cannot be absolutely guaranteed because the list of activities may be incomplete. This incompleteness may be due to decision maker bias and limited resources. The list's incompleteness may or may not be a weakness, depending upon what is missing. If a critical activity is missing, the list is critically incomplete. This step provides for testing the completeness of the decision maker's list of activities for implementing a particular part of the ideal solution. Testing the completeness involves putting the decision maker in contact with lists of activities that he/she may not have considered. The decision maker is then allowed to make any changes in the original list that he/she thinks are warranted, given this new information.

6.4.1 Write down all the ways that you could accomplish this purpose.

6.4.2 Write down all the ways that you could fail to accomplish this purpose and then state them positively so that there are ways of accomplishing the purpose.

6.4.3 Imagine yourself actually accomplishing the purpose; write down what you are doing.

6.4.4 Write down all the unusual ways of accomplishing the purpose.

6.4.5 Write down all those things that have nothing to do with

your accomplishing the purpose and then consider whether or not you want to add them to your list.

6.4.6 Combine all the above responses into a single list of activities.

6.4.7 Test the list for completeness.

6.5 Review the activities.

This step is a quality control mechanism. Its purpose is to identify and correct critical imperfections in the list of activities that has just been developed for implementing a particular part of the feasible solution. A critical imperfection is some characteristic of the activities that would make them, and therefore the part difficult to implement. The list may be imperfect for reasons such as: the activities are improperly sequenced, transitional activities are missing, the activities are ambiguous, or the activities are impractical. An impractical activity is one that is beyond the capabilities of the person expected to perform it. An ambiguous activity is one that does not clearly indicate what must be done to perform the activity. Transitional activities enable a decision maker to move smoothly from one activity to the next. If the activities are not sequenced, a person will be unaware of what activity to perform first, what activity to perform second, third, fourth, etc. Thus, the list of activities may have to be revised for reasons of sequence, completeness, clarity, or practicality.

6.5.1 Arrange the activities in a chronological order.

6.5.2 Examine each activity separately.

6.5.3 Examine the whole list of activities to make sure that there is a logical flow from one activity to another.

6.5.4 Examine the first and last activities on the chronological list to determine whether or not they are in fact the first and last (anchoring) activities.

6.5.5 Look at each activity against its part's purpose and determine if any other activities could/should be added in order to maximize the accomplishment of the part's purpose.

6.5.6 Review the internal consistency of the activities for that part.

6.5.6.1 By inspection.

6.5.6.2 By testing.

6.5.7 Review the external consistency of the activities.

6.5.7.1 By inspection.

6.5.7.2 By testing.

6.5.8 Make any needed changes in the list of activities based on the review.

6.6 Develop the activities which are necessary for the solution to accomplish its purpose.

This step provides for cycling the decision maker back through the three previous steps until implementation activities have been designed for each part of the feasible solution. Then the activities for implementing each part are integrated into a single list of activities for implementing the solution as a whole. This provides the decision maker with a single list of activities for implementing the solution.

6.6.1 Repeat the above steps for each part (recycle to step 6.3).

6.6.2 Integrate the activities of each part into a single list of activities.

6.7 Allocate resources to the activities and confirm the allocation. Make any needed changes in the allocation.

In this step, the resources available for implementing the solution are divided among each of the solution's activities. This will help the decision maker to identify those activities that are impractical. This should also help the decision maker determine if he/she has more resources than he/she needs to solve the problem. Excess resources can be used somewhere else; perhaps on some other problem that is of concern to the decision maker.

6.8 Plan for decision making.

One cannot assume that the solution will be implemented in a static environment. One can also not assume that the planned activities are fail safe. What one can assume is that problems will most likely arise during implementation, and should these problems be critical, they will have to be solved if the solution is to be successful. Thus, a management component may have to be built into the solution. A management component permits corrective action to be taken during implementation. The effectiveness of a management component can be maximized if the component is designed and tested prior to its utilization. A decision maker is put at an obvious disadvantage if he/she attempts to solve an implementation problem through the use of a management component that may have unidentified and uncorrected weaknesses. This step provides for the design and testing of a management component. The design process addresses itself to what is believed to be the critical questions of management. These questions are: Who are the decision makers who are responsible for making corrective decisions? What corrective decisions will most likely have to be made? When will these corrective decisions occur? How will the data necessary to make these corrective decisions be gathered, reported and used? The answers to these questions describe what the management component should do and who it should serve. Just as the solution cannot be considered fail safe, so to the effectiveness of the management component cannot be absolutely guaranteed. Therefore, the management component should be tested and revised if necessary. This step also

provides for testing and debugging. In the final procedures of this step, the management component is tested in a situation that is as close as possible to actual implementation. The testing results are a valid indicator of the management component's effectiveness. These results are more valid than results that come from testing the component in a situation that is significantly different from the situation in which the component will have to be used.

6.8.1 Identify the decision makers.

6.8.2 Identify the decisions that are to be made by the decision makers.

6.8.3 Determine when the decisions are going to be made.

6.8.4 Identify/develop the activities which, when observed, will provide the data needed to make the necessary decisions.

6.8.5 Develop plans for observing the activities.

6.8.6 Develop plans for reporting the data gathered through observation.

6.8.7 Design the process to be used in decision making.

6.8.8 Review the decision making process.

6.8.9 Integrate the plans for observation, plans for reporting, and the decision making process into a single cohesive plan for decision making.

6.8.10 Test the plan for decision making by constructing data which indicate satisfactory, unsatisfactory and grossly deficient performance of an activity and then apply the decision making process to make decisions, given the data.

6.8.11 Integrate the tested plan for decision making into the list of activities (6.6) for accomplishing the purpose.

6.9 Evaluate.

Rationale for the Major Steps of Major Process 7.0:
Implement the Solution

The seventh major process of Decision Making Methodology is "Implement the Solution." This major process consists of the following three major steps.

7.1 Plan the implementation of this step.

7.2 Carry out the activities in the order specified and within the resources allocated to each activity. Use the plan for decision making to make any decisions necessary with respect to the implementation of the solution.

7.3 Evaluate.

At this point, a rationale will be presented for each of the above major steps.

7.1 Plan the implementation of this step.

7.2 Carry out the activities in the order specified and within the resources allocated to each activity. Use the plan for decision making to make any decisions necessary with respect to the implementation of the solution.

This step provides the ultimate test of the Methodology's utility. In this step, the solution is implemented and its effectiveness is observed. The results of this step provide the answers to the following

questions. Does the Methodology really work? Has it designed a solution that will really work or has it designed a solution that simply looks good on paper? The answers to these questions provide the basis for evaluating the solution and the Methodology itself.

7.3 Evaluate.

Rationale for the Major Steps of Major Process 8.0: Evaluate

The eighth major process of Decision Making Methodology is "Evaluate/Reimplement the Solution." This major process consists of the following eleven major steps.

8.1 Plan the implementation of this step.

8.2 Return to step 4.5.1 where the criteria for an acceptable solution were generated and make a list of these criteria.

8.3 Compile all data provided at the decision making points.

8.4 Review each component in light of the data provided to determine the extent to which each component has been accomplished.

8.5 Determine how many of the components have been satisfactorily accomplished (completeness).

8.6 Determine if the highest priority components have been satisfactorily accomplished (focus).

8.7 Determine the number of planned activities that were actually implemented (efficiency).

8.8 If the degree of efficiency, focus or completeness is unsatisfactory, determine the cause.

8.9 Present the results of 8.5 through 8.8 to the temporary decision maker to determine if a reapplication of the Methodology is desired or called for.

8.10 If warranted, reapply the Methodology making the changes indicated in 8.8.

8.11 Evaluate.

At this point, a rationale will be presented for each of the above major steps.

8.1 Plan the implementation of this step.

8.2 Return to step 4.5.1 where the criteria for an acceptable solution were generated and make a list of these criteria.

The reason for implementing the solution was to accomplish the purpose that a decision maker has for solving a particular problem. Therefore, it is logical that criteria for evaluating the effectiveness of the solution come from the purpose itself. These criteria have already been developed and used. They were developed and used in step 4.5 to choose the most appropriate ideal solution. They were also used in step 5.6 to choose a feasible alternative to the ideal solution. These criteria will again be used in this major process as the basis for making a summative evaluation of the solution's effectiveness. In this step, the evaluation criteria are compiled.

8.3 Compile all data provided at the decision making points.

Most of the data necessary to make a summative evaluation should have already been gathered. This should have taken place during the solution's implementation. As the solution was implemented, it was also evaluated. This constituted an "in progress" or formative evaluation. This formative evaluation was accomplished via the solution's management component. It was through the management component that corrective action was or was not taken on the basis of the solution's observed effectiveness. If the solution was not accomplishing its purpose, corrective action was initiated. The data used to make these ongoing evaluation decisions can and should also be used to make summative evaluation decisions.

8.4 Review each component in light of the data provided to determine the extent to which each component has been accomplished.

At this point, the critical components of the decision maker's purpose are examined in light of the evaluation data. The purpose of this examination is to determine which components have and have not been accomplished. This determination permits the effectiveness of the Methodology to be measured in terms that are relevant to the decision maker, these terms being the operational components of his/her purpose. If the decision maker is dissatisfied, then the Methodology may be reapplied.

Decision maker dissatisfaction may indicate that the Methodology needs to be improved. The Methodology has procedures for such improvement.

8.5 Determine how many of the components have been satisfactorily accomplished (completeness).

A decision maker may want to know how many operational components of the purpose have been accomplished. In other words, the decision maker may want to know how "complete" the solution was. This determination will be especially important to a decision maker who wants some degree of accomplishment on many or all of the components of the purpose. In this step, the solution's degree of completeness is determined.

8.6 Determine if the highest priority components have been satisfactorily accomplished (focus).

A decision maker may want to know if the most important operational components of the purpose have been accomplished. In other words, the decision maker may want to know how "focussed" the solution was. This determination will be especially important to a decision maker who considers a problem solved only if the most important components of the purpose for solving that problem are accomplished. In this step, the solution's degree of focus is determined.

8.7 Determine the number of planned activities that were actually implemented (efficiency).

A decision maker may want to know how many of the solution's planned activities were actually implemented. In other words, a decision maker may want to know how "efficient" the solution was. This determination will be especially important to the decision maker who views the failure to implement planned activities as a sign of poor management or inefficiency. In this step, the degree of efficiency of the solution is determined.

8.8 If the degree of efficiency, focus or completeness is unsatisfactory, determine the cause.

In this step, the decision maker is asked to determine if he/she believes that the Methodology has been successfully applied. In doing this, he/she examines the degree of completeness, the degree of focus, and the degree of efficiency. If the decision maker believes that the Methodology has not been successfully applied, if he/she believes that the degrees of completeness, focus and efficiency should be significantly higher than they actually are, then the decision maker may opt for a reapplication of the Methodology. Unsuccessful application of the Methodology may be due to the Methodology's generation of inaccurate data.

Reapplication begins at the point where inaccurate data was first generated. The first step in reapplication is to identify that point. This identification must be made because the Methodology is a systematic process in which the results of one procedure become the raw data to be processed in the next procedure. Thus, a procedure that generates inaccurate data will probably cause subsequent procedures to be inaccurate also. Procedures implemented prior to the point at which inaccurate data was generated need not be reapplied. The procedures that generated inaccurate data may have to be redesigned. The Methodology has steps for the redesign of ineffective procedures.

8.8.1 The solution was poorly implemented.

8.8.2 The solution (activities and/or plan for decision making) was poorly developed.

8.8.3 The major parts of the feasible solution were poorly designed.

8.8.4 The ideal solution was incorrectly conceptualized.

8.8.5 The purpose was poorly stated.

8.8.6 The needs analysis was inadequate.

8.8.7 The preparation for the utilization of the Methodology was inadequate.

8.9 Present the results of 8.5 through 8.8 to the temporary decision maker to determine if a reapplication of the Methodology is desired or called for.

In this step, the decision maker decides whether he/she wants to and can afford to have the Methodology reapplied.

8.10 If warranted, reapply the Methodology making the changes indicated in 8.8.

In this step, reapplication is begun starting with the procedure at which inaccurate data was first generated.

8.11 Evaluate.

This concludes the discussion of the eight major processes of Decision Making Methodology. Not all of the Methodology's procedures have been presented. The procedures that were examined were those that the author believed would enable the reader to comprehend the Methodology as a whole. The entire Methodology is presented in Appendix Three. The remainder of this document will treat the design and results of the study.

CHAPTER III

DESIGN OF THE STUDY

Overview of the Chapter

The purpose of this chapter is twofold---first, to describe and justify the problem of this study; and second, to present the procedures by which this problem will be solved.

There are three things necessary to the production of an effective Decision Making Methodology. First, a definable purpose must be developed. Decision Making Methodology has been designed to accomplish the following purpose: to make decisions that are optimal with respect to a person's desires. In Chapter Two, an indepth analysis of this purpose was presented. Thus, the first requirement for an effective Decision Making Methodology has been satisfied.

Second, the initial set of procedures for accomplishing that purpose must be drafted and refined to the point where they can be tested. Decision Making Methodology consists of eight major processes, each of which has been divided into a series of major steps. A rationale for and description of the major processes and major steps of Decision Making Methodology were presented in Chapter Two. Because the procedures have been developed to the point where they are reasonably operational, and can be tested, the second requirement for an effective Decision Making Methodology has been satisfied. Finally, the Methodology's procedures must be tested to identify problems and if

necessary, revised. Before a fully operational and completely effective Decision Making Methodology is produced, testing and revision must be performed a number of times.

Problem of the Study

The problem of this study is to conduct the first controlled analysis of Decision Making Methodology. This study is concerned with the third requirement for an effective Decision Making Methodology. This problem is a significant dissertation topic for two reasons:

1. Decision Making Methodology is a significant contribution to the field of decision making; and
2. Such an analysis is the next logical step in the further development of the Methodology.

In Chapter One, it was noted that the field of decision making is an area in which theoretical rather than prescriptive approaches are the norm. Young (1966), Michael (1973) and Hodson (1974) have identified the need for an observable and measurable process for decision making. Because the rules and procedures of Decision Making Methodology are reasonably operational, systematic and standardized, the Methodology represents a positive step toward filling that need.

In Chapter Two, it was mentioned that no empirical data exist on the effectiveness of Decision Making Methodology. What does exist is a very complex set of procedures that have been developed over the last two years. It would seem desirable and logical to preface any further development with a conscious effort to identify existing

problems through a field test. If major problems went unidentified and unresolved, major difficulties could arise in future applications of the Methodology. Such a situation would hurt rather than help those whom the Methodology has been built to serve--all decision makers. Furthermore, development without testing is not consistent with the tradition of disciplined and responsible inquiry which must be done if the social sciences are to make progress.

The need for methodologies in the social sciences has been well documented (Benedict, 1973; Coffing, 1973; and Thomann, 1973). This need has been addressed by a number of researchers. Four dissertations have already been completed in the area of methodological development. Dr. Gene Gordon (1973) conducted the first field test of an Evaluation Methodology that was developed by Fortune and Hutchinson. Dr. Larry Benedict (1973) conducted a controlled analysis on a part of that Evaluation Methodology. Dr. James Thomann (1973) conducted the first field test of Metamethodology, which is a methodology for building other methodologies. A colleague of Thomann's, Dr. Richard Coffing (1973), has developed a methodology for the identification of public services demanded by clients. Three other dissertations in the area of methodological development have been completed (Brooks, 1975; Mitchell, 1975; and Rosen, 1974). Thus, in conducting the first controlled analysis of Decision Making Methodology, this author was able to draw upon the previous and ongoing work of others.

Procedures Used

Having described and justified the problem of the study, the specific procedures by which that problem will be solved should be discussed. Before this is done, however, a critical law of research on methodologies should be mentioned. This is the law of parsimony. This law states that the first test of a methodology should be performed under simple conditions. This is done because if the procedures do not work under simple conditions, it is reasonably sure that they will not work under more complex conditions. In following that law, a researcher avoids spending a large amount of resources on a complex test when a much simpler, less expensive test probably would have turned up the same or at least many of the same problems. More complicated tests are only warranted when simple tests have failed to identify problems. The importance of the law of parsimony to methodological development has been well documented (Benedict, 1973 and Coffing, 1973). The first controlled analysis of Decision Making Methodology was conducted according to the law of parsimony. This means that the study occurred in the simplest possible situation. A simple test of Decision Making Methodology permitted much more precise observation of the effectiveness of the methodology because a minimal number of variables was involved.

The study was conducted in two phases. Phase I involved a logical test of the Methodology while Phase II involved a field test of the Methodology in an uncomplicated situation. A logical test was performed first because the first test to which a methodology can and

should be submitted is a test for logic. In doing this, major conceptual problems can be identified and solved. Having done this, the next appropriate test would be an empirical field test in which practical problems are identified. Thus, Phase II involved field testing. This sequence is consistent with the law of parsimony because logical or conceptual problems should be identified prior to the identification of practical or implementation problems. To reverse this order (to perform the field test first) would be unreasonable because both conceptual and practical problems could surface at the same time. For an untested methodology, the number of problems surfacing could be large. Such a situation could very easily cause the study to be unmanageable.

In Phase I, the author logically analyzed the entire Methodology. That is, he critiqued each of the Methodology's procedures in order to identify "gaps". These are points at which there are interruptions or breaks in continuity (Benedict, 1973). Gaps were identified at the three different levels of specificity on which the Methodology is organized. Decision Making Methodology consists of eight major elements; therefore, gaps were first identified at this major element level. Second, since each element consists of major steps, gaps were also identified at the level of major steps. Finally, each major step consists of sub-steps and gaps were identified at this level. Gaps can exist for the same reasons regardless of the level of specificity involved. A gap may exist because there is something missing: an element, a major step or a sub-step. A gap may also exist because what does exist is either poorly worded or incorrectly sequenced.

Thus, gaps may exist for reasons of incompleteness, lack of clarity, or poor sequence. The purpose of Phase I was to identify and fill the most critical gaps. Gaps were filled using a process developed by Thomann (1973). This process is Metamethodology. The purpose of Metamethodology is to develop a methodology for any definable purpose. Thomann's testing of Metamethodology has indicated that it does accomplish its purpose when it is actually used; that is, Metamethodology can build a methodology for a definable purpose. At this point, Metamethodology will be discussed. A general outline of the Methodology's parts and workings will be provided first followed by a more detailed analysis of those parts that were used in this study.

The procedures of Metamethodology (Hutchinson and Thomann, 1974) are organized into the following eight major processes:

1. Prepare to use the methodology.
2. Choose a problem.
3. State the purpose that will solve the problem.
4. Test the purpose to see that it is clear, desirable, practical, and that a methodology does not already exist to accomplish it.
5. Analyze the implications of the purpose.
6. Operationalize the purpose.
7. Design procedures.
8. Test and then revise the purpose and/or procedures if necessary.

In major process one, a person first learns how to use the methodology and then decides how to use the resources that he/she has available for applying the methodology. The next three major

processes are designed to produce a definable purpose around which a methodology can be built. The development of a definable purpose is essential to the development of a methodology. In Metamethodology's second major process, a methodologist will determine the problem that he/she is interested in solving. In major process three, a purpose statement is drafted that will solve the chosen problem, given the desires of the methodologist and the work that has already been done within the problem area. In major process four, the methodologist examines the purpose to see if a methodology can and should be developed to accomplish it. If methodological development is not warranted, given the purpose as it is presently stated, the methodologist has two options: either the wording of the purpose can be changed or methodological development can be halted at this point. Methodological development should only be continued when a purpose statement can be shown to be definable, desirable, practical, and unaccomplished by an existing methodology (Thomann, 1973).

Once an acceptable purpose has been developed, the methodologist must design the procedures by which the purpose will be accomplished. The fifth, sixth and seventh major processes of Metamethodology have been designed to produce the necessary procedures.

In applying major process five, a skeletal outline of the methodology is produced. This outline represents the first approximation of what the fully develcped methodology will look like. This outline consists of those procedures that seem necessary to accomplish the purpose. All of these procedures are suggested by or can be deduced from

the purpose. In other words, the procedures making up a methodology are logical implications of the methodology's purpose.

In most cases, the procedures produced at this point will have to be further developed before the methodology can be actually used--before the Methodology being developed is, in fact, the prescriptive process that it should be. However, further development can be undertaken on any procedure within the original outline. In order to choose which procedure to work on some set of selection criteria must be developed. Because methodologies are only successful insofar as they accomplish a specific purpose, it only seems logical that the necessary criteria be drawn from the purpose itself. The selection criteria are produced by operationally defining the purpose in the sixth major process of Metamethodology. Each procedure within the original outline will most likely be concerned with different parts of the purpose's definition. Insofar as a procedure is directly concerned with the most critical parts of the definition, that procedure itself may be considered critical. Also, some procedures clearly imply the specific steps necessary for their implementation. Such procedures can be further developed with little difficulty. However, some procedures do not clearly imply the procedures necessary for their implementation. In this case, further development is more difficult because a procedure's sub-steps cannot be easily deduced. Further development is focussed on those procedures that are critical, given the definition of the methodology's purpose and difficult, given the methodologist's determination as to whether or not that procedure would be easy to develop.

Major process seven provides for the development of the methodology to the point where it can be tested. This major process fills out the outline that was produced in major process five. This is done by applying to a specific part of that outline the process that was used to develop the outline itself. The end result is the set of substeps necessary to implement the methodology being developed.

A methodologist may repeat major process seven until all the sub-steps necessary to implement every major step have been developed. In this case, development is carried to the point at which the methodology represents a complete, in the absolute sense, set of procedures for accomplishing the main purpose. In this case, the methodologist would be essentially developing and documenting every single behavior that would be required to utilize the methodology successfully in all possible situations. It should be easy to visualize how time consuming such a process would be. Such extensive development is usually not done prior to testing. More often than not, a methodologist will make a subjective determination as to whether or not further development is warranted, given the resources that that development would require. This is a type of cost benefit analysis. When costs outweigh benefits, development is halted and major process seven comes to an end for the time being.

In major process eight, the methodology is tested using either decision or conclusion oriented research procedures. Decision oriented research procedures involve field testing the entire methodology or a particular section of it. The purpose of field testing is to identify problems. The results of the field tests are used by the methodologist

to develop a more complete and hopefully more effective methodology. Only when successive field tests have failed to identify problems should conclusion oriented research procedures be applied. These procedures involve testing propositions about the methodology. In so doing, knowledge is generated about the methodology.

Major process seven and major process eight were used during the course of this study. Major process seven was used in Phase I, while major process seven and major process eight were used in Phase II. At this point, the specific procedures used in each phase will be discussed.

In Phase I, each step of Decision Making Methodology was examined. Steps in which critical gaps were uncovered were redesigned. Critical gaps were chosen on the basis of the following criteria:

1. Interest to the author. Interest is used because this variable controls motivation. Without motivation, it would be difficult if not impossible for the author to complete this study.
2. Significance. This criteria is used because some gaps will be more important than others with respect to developing a more complete, more effective Decision Making Methodology. If this distinction were not made, the redesign undertaken in this phase risks triviality in that it might leave the most critical problems unsolved.
3. Clarity. By this criterion is meant which gap is the author most unclear about filling. Because the author has had substantial experience in the development of methodologies, he may have an innate sense of how to fill certain gaps; i.e.,

their solution will be obvious. These gaps can be filled "on demand." The author should spend his time on filling gaps that are puzzling and unclear. The gaps that were filled in Phase I were those that were most interesting, most significant, and most unclear.

Since a gap is a point at which new procedures are needed to replace ones that have been found to be ineffective or incomplete, the first step in filling the gap is to state the purpose that the new procedures will be designed to accomplish. Once this sub-purpose is stated, the procedures necessary for its accomplishment are developed. This is done by analyzing the sub-purpose. This analysis is designed to identify those procedures that are implied by or can be deduced from the sub-purpose.

When resources permitted, Dr. Hutchinson was asked to analyze the sub-purpose to determine what procedures he thought it implied. Dr. Hutchinson was chosen because of his background in the areas of methodological development and decision making. When gathered, the responses of Dr. Hutchinson were used to test the completeness of the author's original list of implied procedures. From a reasonably complete list of implied procedures, an initial set of steps for filling the gap was chosen.

At this point, the initial set of steps were organized into a rational order of steps which, when implemented, would hopefully accomplish the sub-purpose and thereby fill the gap. The transition from implied procedures to organized steps was made by first striking from the original list any procedures that the author believed are not

needed to accomplish the sub-purpose and then combining into a single step those procedures that seem to go together. Once this thinning and consolidation process was finished, the remaining procedures were arranged into a chronological sequence. The sequence was then examined to make sure that an implementor can move from one step to another. This was done to make sure that there is logical flow from one step to the next. Then the sequence was examined to determine if it contained any serious omissions. If uncovered, such omissions were corrected by adding additional steps.

Because Decision Making Methodology is an integrated system of procedures, new steps must be compatible with existing steps. The Methodology's steps must compliment rather than contradict each other. Thus, any new steps must be consistent internally or within themselves and also consistent externally or with respect to the rest of the Methodology as it has been developed at this point. The external consistency of the steps was examined when the logical flow from one step to another was scrutinized. The external consistency of the newly designed steps was determined in the following two ways. First, the sub-purpose of the new steps was examined in light of the main purpose of the Methodology. If these two purposes are inconsistent, if the sub-purpose does not contribute to the accomplishment of the main purpose of the Methodology, then a problem was presumed to exist. If the author judged the problem to be critical, it was solved by either redesigning the existing steps of Decision Making Methodology or by redesigning the new steps that have just been developed.

The second test of external consistency involved examining each of the new steps against each of the major steps of the Methodology. As with the first test of external consistency, if new and old steps were inconsistent, a problem was presumed to exist. If the author judged the problem to be critical, either the new or the existing steps were redesigned. A gap is not filled until the procedures that have been designed to fill it are fully integrated into the Methodology. The external consistency of new steps must be examined because it cannot simply be assumed that new and old steps will be logically consistent.

In Phase II, the Methodology was field tested using major process eight of Metamethodology. In carrying out the field test, the author first determined what was to be field tested--the entire Methodology or a certain part of it. The author chose to test the entire Methodology because he was interested in the working of the entire Methodology rather than the working of a particular part. Next, the author determined the type of field test to be carried out. Since no field testing had been done on Decision Making Methodology prior to this study, the author decided to test the Methodology in the simplest possible conditions. This decision is consistent with the law of parsimony which states that the first field test of a process should be carried out under simple conditions. The author conceptualized a simple field test as one in which the Methodology is applied for a single decision maker who was interested in the Methodology and who had a positive attitude toward logical problem solving. A single decision maker was chosen because individual decision makers are less

difficult with which to work than are group decision makers. Also, at the time of this study, procedures for working with group decision makers had not been developed. The Methodology can also be applied more effectively if the decision maker is interested in the Methodology. It is much less difficult to work with a decision maker who is interested in the Methodology than with one who is relatively uninterested. An uninterested decision maker might not respond honestly to the Methodology's stimuli. Without the honest responses of the decision maker, it would be difficult for the author to aid the decision maker in making decisions that are optimal with respect to the decision maker's desires.

It would also be difficult to apply the Methodology for a decision maker who had serious doubts about the effectiveness of logical problem solving. This is important because Decision Making Methodology is a logical process. Such doubts might cause the decision maker to be openly or covertly hostile to the Methodology and/or the author. This hostility would seriously limit the amount of useful data that this study would produce because it would necessitate the author explaining, in depth, the rationale for the Methodology's purpose and procedures. Such an explanation is important, however, in the case of an openly hostile decision maker; such an explanation would consume a tremendous amount of resources, leaving very little for the analysis and implementation of the Methodology. Such hostility may also cause the decision maker to "invent" data that could cause the Methodology to fail to accomplish its purpose.

It was also decided that a simple field test would be one which involved a decision maker who had approximately one hundred hours available for the implementation of the Methodology. This figure was chosen because in the author's opinion, most of the Methodology's procedures could be applied for a single decision maker within this amount of time.

Once the nature of the field test was determined, the author decided upon his goals for the field test. These goals were: to identify critical gaps in the Methodology and to fill critical gaps in the Methodology. The author then conceptualized how he might measure the extent to which these goals were fulfilled. The fulfillment of the first goal was measured by the author asking himself if the gaps identified were interesting, significant and unclear. As was mentioned earlier, critical gaps are ones that met these three criteria. The fulfillment of the second goal was measured by the author examining the steps that were designed to fill a critical gap. If the steps were reasonably complete, logically coherent and consistent with the existing major steps of the Methodology, then the author assumed that the gap had been filled.

In Phase II, the Methodology's procedures were implemented exactly as they are stated. In some cases, the procedures being implemented were ones that had been redesigned in Phase I. All results were recorded, and the most critical gaps found were filled by further developing the Methodology. The process used for selecting and filling gaps in Phase II was the same process used in Phase I. The author did not attempt to solve all the problems that the field test uncovered;

however, he developed solutions for the most critical ones. Unsolved problems are noted and included in the final chapter of this document.

An exact log of all activities was kept. An entry was made whenever the author performed an activity which was in his own subjective opinion, significant to the study. All entries made were as complete and as operational as possible. The form in which entries were made depended upon the phase of the study. During Phase I, entries included the following components:

1. The title of the step that was logically analyzed.
2. Any gaps that were uncovered by this analysis.
3. A description of the gaps uncovered.
4. A rating of gaps uncovered against the criteria for choosing a critical gap (i.e., is the gap interesting, significant and unclear?).
5. Any redesign that was undertaken.

During Phase II, entries included a slightly different set of components. These components were:

1. The title of the step being implemented.
2. The activities that were actually carried out.
3. If there is a difference between components one and two, this was noted and explained.
4. The results of implementation.
5. Any problems encountered.
6. Any redesign that was carried out.

This log was used to write the remaining chapters of this document. There are three remaining chapters. Chapter Four is devoted to

the first phase of this study. In that phase, Decision Making Methodology was analyzed in order to identify gaps in its logic. The fourth chapter contains the gaps that were identified together with any new procedures that were developed. Chapter Five is devoted to the second phase of the study. In that phase, Decision Making Methodology was field tested in an uncomplicated situation. Chapter Five contains the results of the field test, the problems encountered and any redesign that was undertaken. The final chapter of this document--Chapter Six--summarizes the results of the study, states and discusses the conclusions that can be drawn from these results and presents the author's recommendations as to some of the types of research that he believes should be performed on the new version of Decision Making Methodology that was developed during the course of this study.

Limitations of the Study

The purpose of this study implies its limitations. The purpose of this study was to identify problems in Version III of Decision Making Methodology. The limitations implied by this purpose are as follows:

1. This study has not demonstrated that the Methodology is problem free.

Prior to this study, Decision Making Methodology had never been tested. In this study, both the logic and the utility of the Methodology were examined. This examination was designed to uncover some, but not necessarily all, of the problems that may exist in the

present procedures. It would be impossible to identify all the problems that may exist because theoretically, one could go on identifying problems indefinitely. The problems identified were the ones that could be identified, given the resources of this study. Thus, there may exist problems within the Methodology that have not been identified during the course of this study. Many problems were identified and the Methodology was redesigned at those points where critical problems were uncovered. Some problems identified during the course of this study have been left unresolved. The problems left unresolved are those that the author believed not to be critical to the effectiveness of the Methodology.

2. This study has not produced generalizeable knowledge.

This study has produced data that can be used by the author and other methodologists to further develop Decision Making Methodology. The purpose of field testing is to produce such data. Generalizeable, universally valid knowledge was not produced. Knowledge would have been produced if this study had been an experiment and had used conclusion oriented research procedures. These procedures would have called for testing propositions about the Methodology. Conclusion oriented research is only sensible when successive field tests have failed to identify major problems. Because Decision-Making Methodology has never been field tested, but has been developed to the point where it should, this study involved field testing rather than experimentation.

This study was conceived and carried out with the intention of making a significant contribution to the development of an effective Decision Making Methodology. The existence of problems does not detract from the significance of the Methodology. Besides identifying problems, this study has documented the Methodology's utility in an uncomplicated situation. In the field test, the Methodology did accomplish its purpose; it enabled a single decision maker to make a decision that was optimal with respect to his desires. Although a problem free Decision Making Methodology is an ideal that is sincerely pursued, this pursuit cannot be expected to end with the first piece of research that is performed. Much remains to be done. Hopefully, this study will have identified those points at which additional development and testing are most needed. The results of the study are presented in the remaining chapters of this document.

CHAPTER IV

RESULTS OF THE LOGICAL ANALYSIS

Overview of the Chapter

In the chapter, the results of the logical analysis of Decision Making Methodology are presented. The purpose of performing the logical analysis was to identify gaps. Gaps are those points where there are interruptions or breaks in the Methodology's continuity. Some redesign was undertaken as the logical analysis was being performed. The redesign undertaken involved the development of new methodological procedures to fill those gaps that the author believed to be critical to the effectiveness of the Methodology.

It should be stressed that the purpose of the logical analysis was to identify gaps or problems in the existing documentation of the long form of Decision Making Methodology. The purpose of the logical analysis was not to prove that the Methodology is problem free. A problem free Decision Making Methodology can be produced by drafting successive versions of the Methodology, each of which contains fewer gaps than the previous version. This study has uncovered a number of gaps in the existing procedures. The most critical gaps have been filled through the design of new procedures. These new procedures were used to draft a more current version of the Methodology. In so doing, it is hoped that a more effective and more complete version of the Methodology will have been produced. Thus, this study represents an important step in the development of a problem free Decision Making Methodology.

The existence of gaps in Version III does not detract from the importance of developing an effective Decision Making Methodology. In Chapter One, the importance of Decision Making Methodology was discussed in detail. In that chapter, it was noted that leading professionals in the area of decision making acknowledge the need for an operational decision making process. Because Decision Making Methodology's procedures are reasonably operational, they represent a useful first step in the fulfillment of that need. In that same chapter, it was also noted that leading professionals believe that the effectiveness of a given decision can be substantially increased if the intuition and judgement of a decision maker are used throughout the decision making process. Decision Making Methodology has systematic procedures for identifying and using the intuition and judgement of a decision maker, and for this reason Decision Making Methodology may also be viewed as a useful contribution to the field of decision making.

This chapter is divided into eight sections--one for each of Decision Making Methodology's eight major processes. In each section, the critical gaps identified in a given major process will be discussed. Although each of Decision Making Methodology's procedures were examined during the course of the logical analysis, only those procedures in which a critical gap was discovered will be discussed in this chapter. This is done because the chapter would be unreasonably long if the author presented the results of his analysis of each separate procedure regardless of whether or not that procedure contained a critical gap.

Each section will use the following format to discuss the critical gaps that were identified. First, the step or steps in which the

critical gap was identified will be stated and blocked out. Second, the gap identified will be discussed. Finally, any new procedures that have been designed will be listed.

Some of the gaps uncovered in the Methodology were left unfilled due to resource limitations. Unfilled gaps are discussed in the final chapter. One of the purposes that this chapter should serve would be to act as a guide as to what further research and development can and should be done on Decision Making Methodology.

Gaps Identified in Major Process 1.0: Prepare for the Utilization of the Methodology

This section is divided into five sub-sections. Each sub-section corresponds to a particular major step within the first major process. This section has been sub-divided because major process number one is the most highly developed of Decision Making Methodology's eight major processes.

Gaps Identified in Major Step 1.2: Develop a Current Version of the Methodology

1.2.1 Choose the methodology to be developed.

1.2.1.1 Determine the population that the developer is interested in serving.

1.2.1.2 Determine the methodologies that are most needed by that population.

1.2.1.3 Determine the methodologies that the developer is

most capable of developing.

1.2.1.4 Interface 1.2.1.2 and 1.2.1.3.

1.2.1.5 Choose the methodology to be developed based on the needs of the population and the strengths of the developer.

1.2.1.6 If the population has need of a methodology with which the developer has no expertise, the developer may either attempt to learn the needed methodology or he/she may call upon another methodologist who does have the expertise. If the population has a need for which no methodology exists, the developer may use meta-methodology to develop a methodology to meet the need or he/she may call upon another methodologist to develop a methodology to meet the need.

The author found the above steps to be impractical. These steps were considered to be impractical because they required an amount of resources that would not normally be available to a methodologist for the purpose of selecting the methodology he/she would like to improve. The above steps are also incomplete. They provide only a single criterion for selecting the methodology to be developed. The criterion supplied is the interests of a particular client group. The above steps do not provide for using the interests of the methodologist as the basis for selecting the methodology to be developed. Both the interests of the of the methodologist and the needs of a particular client group should

be considered as possible selection criteria. To fill these two gaps, the above steps were completely revised. The new procedures provided two separate selection processes--the one to be used when the resources are large; the other to be used when the resources are limited. When the resources are limited, the interests of the methodologist are used as selection criteria. When the resources are large, the interests of a client group are used as selection criteria. There already exists a set of procedures for determining the interests of a particular client group. That set of procedures is the Coffing Client Demand Methodology (Coffing, 1972). The purpose of this methodology is to determine the services or products needed or demanded by a particular client group. The new version of these steps provides the methodologist with the option of using the Client Demand Methodology when there are a large amount of resources available to choose the Methodology to be developed.

1.2.2 Choose the methodology to be developed.

1.2.2.1 Determine the resources available for selection.

1.2.2.2 If the resources are large, go to 1.2.2.3. If the resources are small, go to 1.2.2.4.

1.2.2.3 Use the Coffing Client Demand Methodology to select the methodology to be developed.

1.2.2.4 Use the interests of the methodologist to determine the methodology to be developed.

1.2.2 The developer identifies all those who have used any version of the methodology to be developed.

Two gaps were uncovered in the above step--the first related to wording; the second related to practicality. This step is improperly worded because it does not accurately convey its purpose which is to identify those people who have had the type of contact with the methodology that would have resulted in the identification of the largest possible number of critical gaps. The present wording did not clearly convey that purpose. This step is also clearly impractical. It is impossible to identify "all those who have utilized any version of the methodology to be developed." To do so would require a tremendous amount of information. The methodologist would have to know with absolute certainty each and every individual who has had any type of contact with the methodology ever since its initial stages of development. Not only would it be very costly to acquire this information but the information itself may not be particularly useful. It may be much more economical and much more effective to identify a reasonable number of people who have utilized the most recent version of the methodology in a reasonably rigorous manner. This approach would be more practical because fewer people will have to be identified. Fewer people will have used the most recent version of the methodology than will have used all earlier versions. This approach may also be much more effective because it should uncover gaps that have not already been filled. Critical gaps uncovered in earlier versions of the methodology may not exist in the latest version of the methodology. This is possible because the most recent version of the methodology represents a compilation of the most critical development done to date. In order to fill these two gaps, the present step was completely redesigned. The new step together with the substeps for implementing it appear below.

1.2.3 Identify those who have had the type of contact with the most recent version of the methodology that will most likely result in the identification of gaps.

1.2.3.1 List the ways in which one may have contact with the methodology.

1.2.3.2 Choose the way that has the highest probability of uncovering gaps.

1.2.3.3 Identify as many of those who have used the most recent version of the methodology in the above way as possible.

1.2.3.4 Test the completeness of this list.

1.2.3.5 From this list, choose the most appropriate past utilizer(s).

1.2.3.5.1 Identify the criteria on which the selection will be made. (One may consider such criteria as the knowledge and experience of the past utilizer or the scope and rigor of the utilization.)

1.2.3.5.2 Measure the past utilizer(s) against each of the criteria.

1.2.3.5.3 Select the past utilizer who has the highest rating and with whom the methodologist has not already worked.

1.2.3.5.4 Make sure that the methodologist is committed to working with the selected utilizer.

1.2.3.5.5 Confirm the past utilizer selected with any individual or group whom the methodologist chooses based on preference, law or policy.

1.2.3 Test the list of utilizers for completeness.

There already exists a step for testing the completeness of a list of utilizers. This step is found within the new set of steps that have been developed for identifying those people who have had the type of contact with the most recent version of the methodology that will most likely result in the identification of gaps. The fourth step in that new set of steps provides for testing the completeness of a list of utilizers. Therefore, this step is redundant because its purpose has already been accomplished by a previous step. In order to avoid repetitive procedures, the above step was deleted from the Methodology.

1.2.4 Identify gaps found in the methodology by the utilizers.

This step was completely redesigned because a number of critical gaps were identified in its initial sub-steps.

1.2.4.2 Secure the cooperation of the utilizers.

A major gap was uncovered in the sequencing of the above step. Securing the cooperation of the utilizer did not seem to be a logical sub-step in the identification process. Cooperation should be secured before the process begins. Therefore, the above step was incorrectly

sequenced; it should appear earlier. The above step also seemed to be part of a larger process that, as of yet, had not been documented. Cooperation may be viewed as a prerequisite; something that must be secured before the methodologist and a past utilizer can interact for the purpose of identifying gaps. However, other details also need to be worked out prior to the interaction of the methodologist and the past utilizer. These details include a plan for interacting with the past utilizer. The author believed that a separate process should exist for developing the details of how a methodologist and a past utilizer might interact and that an initial step in that process should be the securing of the past utilizer's cooperation. To fill this gap, the author has added the following procedures.

1.2.4 Prepare for interacting with the past utilizer.

1.2.4.1 Develop a brief explanation of why the past utilizer is being contacted and how he/she and the methodologist might work together.

1.2.4.2 Identify and confirm a time when the methodologist can discuss the above information with the past utilizer.

1.2.4.3 Meet with the past utilizer to determine if his/her cooperation can be secured. If so, proceed to the next step. If not, determine the problem and make a judgement as to whether or not the problem can be solved practically. If it can, do so; if not, cycle back to 1.2.3.5.3 and choose another past utilizer.

1.2.4.4 Develop a plan for interacting with the past utilizer.

This plan should be specific with respect to the resources to be used and the activities to which these resources are to be allocated.

1.2.4.3 Ask each utilizer the following questions:

1.2.4.3.1 Did your utilization of the methodology identify any gaps?

The sequencing and wording of the above steps were changed. The above step was resequenced as the first step in the process of identifying gaps. The wording of the step was changed because the above wording was too narrow. The original wording limited the methodologist and the past utilizer to direct verbal interaction. There is no reason to assume that a methodologist and a past utilizer cannot interact indirectly and/or non-orally for the purpose of identifying gaps in the Methodology. In fact, how the methodologist and the past utilizer interact depends upon the plan for interaction that was developed in the previous step. The revised version of the above step appears below.

1.2.5 Identify gaps found in the methodology by the past utilizers.

1.2.5.1 Implement the plan for identifying gaps with a particular past utilizer.

1.2.5.2 Cycle back to 1.2.3.5.3 and identify the next past utilizer with whom gaps that are to be identified and repeat the previous steps with that past utilizer.

1.2.5.3 Repeat the above steps until the methodologist has

worked with as many of the past utilizers as possible, given the available resources.

1.2.5.4 Compile a single list of gaps.

1.2.5.5 Test the completeness of the list of gaps.

1.2.5.5.1 Gather test of completeness data by performing any one or combination of the following tasks.

1.2.5.5.1.1 Read the most recent version of the methodology to identify gaps.

1.2.5.5.1.2 Have other methodologists review the most recent version of the methodology.

1.2.5.5.1.3 Have others who are experienced in the problem that the methodology is designed to solve read the most recent version of the methodology in order to identify gaps.

1.2.5.5.1.4 Consult others who have had contact with earlier versions of the methodology.

1.2.5.5.2 Review the test of completeness data and make any changes in the original list of gaps that may seem appropriate.

1.2.4.3.2 Of these gaps, were any filled and if so, what were the rules and procedures used to fill the gaps?

The purpose of this step is to identify any work that has already been done on filling a particular gap. Given this purpose, this step is incorrectly sequenced. It should appear in later sections of this major step. It is not a logical sub-step in the process for identifying gaps because the information to be provided through the use of this step does not improve the effectiveness of the identification process. However, the information to be provided through the use of this step would be helpful in choosing and filling particular gaps. Gaps could be chosen on the basis of the relative difficulty of filling them. An indicator of this difficulty would be the type and amount of work that has already been done on filling the gap. If a great deal of work has already been done on filling a particular gap, then the methodologist may assume that the gap may not be difficult to fill. In most cases, work already done on filling a particular gap could be used in filling the gap itself. Past work is one indicator of what future work remains to be done. Because the above steps were incorrectly sequenced, they were removed from their present position and integrated into later stages of this major step.

1.2.5 Test the list of gaps for completeness.

1.2.5.1 Repeat step 1.2.4 for a different group of utilizers.

1.2.5.2 Do any combination of the following things.

1.2.5.2.1 Read the latest version of the methodology in order to identify gaps.

1.2.5.2.2 Teach the methodology and document all problems.

1.2.5.2.3 Apply the methodology and document all problems.

1.2.5.2.4 Answer the question in 1.2.4.

1.2.5.3 Repeat step 1.2.4.3 for those methodologists identified in 1.2.3.3.

1.2.5.4 Make any needed changes in the list of gaps based on the above tests of completeness.

There already exists a step for testing the completeness of a list of gaps. This step is found within the new set of steps that have been developed for identifying gaps found in the methodology by the past utilizers. The fifth step in that new set of steps provides procedures for testing the completeness of a list of gaps. Therefore, this step is redundant because its purpose has already been accomplished by a previous step. In order to avoid repetitive procedures, the above step was deleted from the Methodology.

1.2.5.5 Prioritize the list of unfilled gaps.

Three gaps were discovered in the above step. First, the above step is incorrectly sequenced. Prioritizing a list of unfilled gaps is not a logical sub-step in the process for testing the completeness of that list. Prioritization is a way of selecting the gaps to be filled, and this selection should be made only after a reasonably complete list of gaps has been developed. To fill this gap, a new set of steps was developed to select the gaps to be filled. The new selection procedures are to be used after a reasonably complete list of gaps has been developed.

The second gap involves the completeness of the above step. The above step did not specify the criteria against which the gaps are to be prioritized. Although a number of selection criteria could be used, no specific criteria were mentioned; therefore, the above step was incomplete. To fill this gap, specific selection criteria were added into the new set of steps that had been developed for selecting the gaps to be filled. The criteria that were added were the significance of the gap and the difficulty of filling it. The relevance of these two criteria in the selection of gaps to be filled in developing a more current version of the Methodology has already been discussed in detail in Chapter Three, "The Design of the Study."

The third gap involved the above step's practicality. This step did not make any allowance for the available resources or for the number of gaps from which critical gaps had to be selected. To fill this gap, two different selection strategies were developed. One was to be used when both the resources and the number of gaps are large, while the other was to be used when either or both the resources and/or the number of gaps are small. The following procedures were developed to fill the above three gaps.

1.2.6 Select the gaps to be filled.

1.2.6.1 Operationalize the purpose of the methodology.

1.2.6.2 Review the resources available for selecting gaps and the number of gaps that have been identified. If both the resources and the number of gaps are large, go to step 1.2.6.4. If the number of gaps and/or the amount of resources are small, go to 1.2.6.3

1.2.6.3 Select the first gap that is both difficult to fill and critical, according to the operationalized definition of the methodology's purpose.

1.2.6.4 Divide the gaps into categories.

1.2.6.4.1 Review each gap and make the following determinations:

1.2.6.4.1.1 Is the gap critical?

1.2.6.4.1.2 Is the gap difficult to fill?

1.2.6.4.2 Organize the gaps into the following categories:

1.2.6.4.2.1 Gaps that are both critical and difficult to fill.

1.2.6.4.2.2 Gaps that are critical but not difficult to fill.

1.2.6.4.2.3 Gaps that are difficult to fill but which are not critical.

1.2.6.4.2.4 Gaps that are both not critical and not difficult to fill.

1.2.6.4.3 Prioritize the gaps within the first/ next category.

1.2.6.4.4 Review this prioritization in light of the gaps in the next category to see if any changes should be made.

1.2.6.4.5 Choose the highest priority gap.

1.2.7 Evaluate the implementation of this major step.

No critical gaps were discovered in the above step. However, there was some doubt in the author's mind as to whether or not it was appropriate to proceed directly from this step to the next major step which involved dissemination. When a current version of the Methodology has been developed, is dissemination the next logical step? The author believed this sequence to be unnecessarily rigid. Once a methodologist has developed a more complete and hopefully more effective version of the Methodology, dissemination of that version is an option but not a necessity. A number of other options exist. For example, a methodologist could teach, apply or field test the new version of the Methodology. What was missing was a step in which a methodologist could decide what, if any, additional contact that he/she may want to have with the Methodology that has just been worked on. To fill this gap, the author added a step that would cycle the methodologist back to the first major step in the first major process of the Methodology. Using the procedures of this step, the methodologist could determine if additional contact with

the Methodology is appropriate and if so, what the specific details of that contact should be.

1.2.8 Cycle back to step 1.1 and use the procedures of this step to decide what, if any, additional contact the methodologist may want to have with the methodology he/she has just worked on.

Gaps Identified in Major Step 1.3:
Disseminate the Methodology

1.3 Disseminate the methodology.

A slightly different approach was used in analyzing the logic of this major step. Rather than examine each of its procedures for gaps, the entire step was compared to an existing dissemination methodology. The dissemination methodology with which this step was compared is being developed by Mr. William Welsh (Welsh, 1974). This comparison was made in order to uncover overlap. If substantial overlap was uncovered, then it might be wise to combine these two approaches to dissemination in some way so as to avoid any further duplication of effort. The degree of overlap that might exist between these two sets of procedures could not be determined prior to this study because at that time, Mr. Welsh's dissemination methodology was not adequately documented. However, when this study was initiated, Mr. Welsh's dissemination methodology had been documented adequately enough so that it could be field tested. Thus, a

more definitive determination as to the similarity of these two approaches to dissemination could be made.

If the procedures that make up this step of Decision Making Methodology and the procedures that compose Mr. Welsh's dissemination methodology are similar then they both would have been designed to accomplish similar or identical purposes. The purpose of Mr. Welsh's dissemination methodology is to meet needs through the dissemination of products. The purpose of the dissemination procedures used in this step of Decision Making Methodology is to make Decision Making Methodology available to those who need it. Both purposes are similar in the sense that they each involve meeting needs. However, are the purposes similar in the way that they meet needs? These two approaches may be concerned with disseminating two different things. Mr. Welsh is concerned with meeting needs through the dissemination of products, while the above step is concerned with meeting certain needs through the dissemination of Decision Making Methodology. Is Decision Making Methodology a product? If not, Decision Making Methodology could not be disseminated through the use of Mr. Welsh's dissemination methodology. In this case, there would be little similarity between Mr. Welsh's dissemination methodology and the procedures that make up this step of Decision Making Methodology.

Mr. Welsh states that, "A product can be anything that meets an identified need--be it an idea, a process, a piece of hardware, or whatever" (Welsh, 1974). Decision Making Methodology is a process. The need that Decision Making Methodology has begun to satisfy is the need for an operational decision making process. Thus, Decision Making Methodology satisfies Mr. Welsh's definition of a product. Because Decision

Making Methodology can be viewed as a product, at least according to Mr. Welsh's definition, the purpose of Mr. Welsh's dissemination methodology and the purpose and procedures that make up the above step of Decision Making Methodology may be considered similar.

Besides reviewing the purposes of these two approaches to dissemination, the author also reviewed the major procedures that have been developed for accomplishing each purpose. This was done as a check on the overlap that was discovered when their purposes were compared. In order to meet needs through the dissemination of products, Mr. Welsh has developed the following major procedures: identify those populations who have need of the product, make the product as well as any necessary support services available to these populations, evaluate the effects of accepting or rejecting the product, and finally, evaluate the effectiveness of the dissemination process as a whole. In order to make Decision Making Methodology available to those who need it, the author has developed the following major procedures: identify potential utilizers of the Methodology; provide these potential utilizers with the opportunity to accept or reject the Methodology; if accepted, assist the user if such assistance is requested or needed; measure the impact of the Methodology's use; and finally, evaluate the dissemination process as a whole.

The above analysis indicates that there is substantial similarity between the purposes and major procedures of Mr. Welsh's dissemination methodology and the dissemination procedures that are used in this step of Decision Making Methodology. However, this similarity should not be taken to mean that these two approaches to dissemination are exactly the same. It is possible that a more detailed analysis would have uncovered

some significant differences. Each and every procedure contained within these two approaches could have been compared. Such a detailed analysis was not done for two reasons. First, it would have required allocating a very large amount of resources to what was in fact a small problem within a much larger study. Second, the analysis that had already been performed on the purposes and major procedures of these two approaches to dissemination had uncovered a substantial degree of overlap. Therefore, the purpose of the comparison had been achieved--overlap had been discovered.

The degree of overlap uncovered has led the author to conclude that these two approaches to dissemination might best be combined in a single approach to dissemination. If this were not done, if these two approaches continued to be developed separately, what may result could be two highly developed though essentially identical sets of procedures. Such a situation would represent a serious duplication of effort and should therefore be avoided.

A single unified approach to dissemination was not developed during the course of this study due to resource limitations. However, the author recommends that in future studies, a fairly high priority be placed on the integration of these two similar though not identical dissemination processes. An effective dissemination process is critical because it could be a way of making high quality products more readily available to those who need them.

Gaps Identified in Major Step 1.3:
Disseminate the Methodology

1.4.4 Select the group to whom the methodology is to be taught.

The wording of the above step implied that the teaching methodologist is aware of individuals and groups that want to learn how to apply the Methodology. However, wanting to learn the Methodology requires having knowledge of the Methodology itself. Without this information, people would be hard pressed to decide whether or not learning the Methodology is something that they really want to do. However, in previous procedures, no provision had been made for informing the general public as to the nature and existence of the Methodology. The absence of such a step is a major gap. To fill this gap, the author developed the following procedures and introduced them prior to the above step.

1.4.4 Inform the general public as to the nature and existence of the methodology.

1.4.4.1 Develop a short description of the methodology.

1.4.4.2 Develop a plan for distributing this description to as large an audience as possible. This audience should be diversified with respect to such factors as age, vocation, sex, and ethnic identify. The distribution plan should contain provisions for providing additional information about the methodology should such information be requested. The distribution

plan should also contain provisions by which one may inform the methodologist of his/her interest in the methodology.

1.4.4.3 Implement the plan and monitor positive and negative reactions to the methodology.

1.4.7 Develop the teaching sequence.

1.4.7.1 Develop a sequenced series of learning objectives.

1.4.7.2 Develop a strategy to teach each one of the sequenced learning objectives.

1.4.7.3 Develop a simulation for each objective for which a teaching strategy has been designed. (Refer to Instructional Simulation Design Methodology.)

A major gap was discovered in the above step. It is impractical. It would require a vast amount of resources to develop a simulation for each separate learning objective that a teaching methodologist has planned to accomplish. This is not to say that simulations are not useful. Simulations provide a learner with an opportunity to use the procedures of Decision Making Methodology in a low risk situation. This situation is low risk because, by definition, a simulation is an "unreal" situation and consequences of not applying the Methodology successfully are much less in an unreal situation than they are in a "real" application. Simulations should be viewed as alternative teaching strategies and not as necessary components of every teaching strategy as the above step implies.

Simulations should be considered along with other teaching strategies such as lecturing, demonstration and discussion. To make this step practical, its sequence was changed. It was integrated into the step immediately preceding it. The specifics of this change appear below.

1.4.7.2 Develop a strategy to teach each one of the sequenced learning objectives.

1.4.7.2.1 Choose the first (next) learning objective for which a teaching strategy is to be developed.

1.4.7.2.2 State the purpose of the chosen learning objective.

1.4.7.2.3 Develop an exhaustive set of alternative plans for teaching the objective by analyzing the implications of the objective's purpose. In developing the list, consider such alternative teaching strategies as simulations, lectures, discussions, and demonstrations.

1.4.7.2.4 Choose the alternative to be implemented.

1.4.7.2.5 Plan for the implementation of the chosen alternative. If the alternative chosen is a simulation, develop the details of the simulation through the use of Instructional Simulation Design Methodology.

1.4.7.2.6 If possible, field test the planned teaching strategy.

1.4.7.2.7 Repeat the above process for each objective or move on once a single teaching strategy has been developed for a single objective.

1.4.11 Integrate the newly prepared methodologist into a larger system of methodological development.

1.4.11.1 The teaching methodologist operationally defines the following concept: "Contributing to methodological development."

1.4.11.2 Test the completeness of the above definition.

1.4.11.3 Measure the degree to which the newly trained methodologist satisfied the above definition.

1.4.11.4 Identify that part(s) of the definition which the newly prepared methodologist most completely satisfies.

1.4.11.5 The teaching methodologist secures the consent of the newly trained methodologist to contribute to methodological development in that area which the strength is the greatest.

1.4.11.6 The teaching methodologist and the newly trained methodologist develop and implement the plan for the newly trained methodologist contributing to methodological development.

The above steps have a common weakness. That weakness being that the newly trained methodologist plays a minor role in the determination of how he/she is to contribute to the area of methodological development. The newly trained methodologist merely consents to a plan that has been developed by the teaching methodologist. The above steps also

assume that the newly trained methodologist wants to contribute. It is possible that after having learned how to use the Methodology, a learner may decide that it is inappropriate and that further involvement is unnecessary. This is possible because training in the use of the Methodology provides the learner with more information about the Methodology itself. This information could cause the learner to be less interested in the Methodology than he/she was when training began. Interests do not necessarily remain constant.

It is recommended that these steps be redesigned so that they, first of all, take into account whether or not a newly trained methodologist wants to contribute to a system of methodological development and that second of all, should a newly trained methodologist decide to make a contribution, that the specifics of that contribution be developed from the perspective of the newly trained methodologist and not from the perspective of the teaching methodologist. The changes recommended were not made during the course of this study because the author did not believe that they would be difficult to carry out. To carry out the recommended changes, one would simply have to make minor modifications in the existing steps.

Gaps Identified in Major Step 1.5:
Negotiate the Decision Making Contract

1.5.2 Develop a list of potential clients.

This step has an inherent limitation. That limitation being the perspective of the methodologist. A methodologist's perspective will determine to a large extent the nature and number of the potential clients identified in this step. A methodologist's perspective may cause the list of clients to be unnecessarily narrow. All other things being equal, the narrower the list of potential clients, the smaller are the chances of finding a client for whom the Methodology can be applied successfully. In order to fill this gap, procedures were added that complemented the perspective of the methodologist. The author could have added procedures which controlled or removed the perspective of the methodologist. However, such procedures were not designed because the author believed that they would be inappropriate. Such procedures would be inappropriate because the perspective of the methodologist, which has been molded through experience and preparation, is a very useful resource in the selection of clients. If this perspective were completely removed, the selection process might be done more harm than good.

The procedures that were added were the same procedures that were designed to fill a gap uncovered in step 1.4.4. The procedures that were added here form a new step to be implemented prior to step 1.5.2. These steps together with the procedures that already exist for testing the completeness of the list of potential clients should provide reasonable checks on the unconscious narrowing of a list of potential clients. The procedures that were added were as follows:

1.5.2 Inform the general public as to the nature and existence of the methodology.

1.5.2.1 Develop a short description of the methodology.

1.5.2.2 Develop a plan for distributing this description to as large an audience as possible. This audience should be diversified with respect to such factors as age, vocation, sex, and ethnic identify. The distribution plan should contain provisions for providing additional information about the methodology should such information be requested. The distribution plan should also contain provisions by which one may inform the methodologist of his/her interest in the methodology.

1.5.2.3 Implement the plan and monitor positive and negative reactions to the methodology.

1.5.7 Develop a contract statement which will include:

1.5.7.1 The name of the contract decision maker.

1.5.7.2 The area(s) of concern within which the methodology will be applied.

1.5.7.3 The decision makers for whom the methodology will be applied. Decision makers should be those individuals who have primary responsibility for meeting needs within the chosen area of concern.

1.5.7.4 The resources to be utilized.

1.5.7.5 The methodology to be employed.

1.5.7.6 The time period within which the work will be done.

Two gaps were uncovered in the above procedures. First of all, there were no provisions for gathering the above information prior to using that information to draft a formal or informal contract statement. Second of all, there was no provision made for confirming the contract statement with other people chosen on either the basis of the preferences of the decision maker or on the basis of the laws and policies under which the decision maker operates. In order to fill these gaps, the above steps were removed and the following steps were added.

1.5.8 Gather the information necessary to develop a contract statement.

1.5.8.1 The name of the contract decision maker.

1.5.8.2 The problem area in which the contract decision maker wants to make decisions.

1.5.8.3 The specific dates of the contracting period.

1.5.8.4 The names of any other decision makers for whom the contract decision maker would like to see the Methodology applied and who make decisions with respect to the problem area.

1.5.8.5 The resources that will be available for this application of the Methodology.

1.5.8.6 The amount of resources to be allocated to each decision maker.

1.5.8.6.1 Prioritize the decision makers.

1.5.8.6.2 Allocate the resources for this application of the Methodology among the decision makers, according to their priorities.

1.5.8.6.3 Allocate the resources for each decision maker among the major processes of the Methodology according to the following percentages. These percentages are based on percentages developed by Hodson (Hodson, 1974).

Major Process	%
1. Prepare for the utilization of the Methodology.	10%
2. Perform a needs analysis.	
3. Develop a purpose.	2%
4. Conceptualize the ideal solution.	10%
5. Design the actual solution.	10%
6. Plan the implementation of the solution.	18%
7. Implement.	40%
8. Evaluate.	10%

1.5.8.7 Review the resource allocation.

1.5.8.7.1 Ask the contract decision maker to examine the allocation and make any adjustments that he/she believes are necessary.

1.5.8.7.2 Explain to the contract decision maker the contingencies under which the terms of the contract may be altered.

1.5.8.7.3 Ask each decision maker to confirm his/her willingness to work with the methodologist. Also have each decision maker confirm his/

her ability to supply the resources that the contract decision maker has said that they could supply. Any problems regarding the commitment or resources of any decision maker should be communicated to the contract decision maker.

1.5.8.7.4 Explain to each decision maker the contingencies under which the terms of the contract may be altered.

1.5.8.7.5 Determine when each decision maker, including the contract decision maker, will be available during the contracting period.

1.5.9 Develop a formal or informal contract statement using the above information.

1.5.10 Confirm the contract statement with appropriate individuals chosen on the basis of either the preference of the contract decision maker or on the laws or policies that govern the actions of the contract decision maker.

1.5.11 The contract decision maker approves the contract statement.

1.5.12 Evaluate the effectiveness of this major step.

1.5.13 Choose the highest priority decision maker who is available to implement the next major step.

Gaps Identified in Major Step 1.6:
Plan This Application of the Methodology

1.6.1 Create an "application" matrix.

1.6.1.1 Along the top of the matrix, place the names of all the decision makers involved in this application.

1.6.1.2 Along the side of the matrix, place the names of each major process of the methodology to be used.

1.6.1.3 Develop each cell of the matrix by reviewing the most recent version of the methodology to determine what set of procedures is most appropriate for that decision maker to accomplish the purpose of that major process.

1.6.1.4 Review the activities developed for each cell.

1.6.1.5 Arrange the activities in each cell in a chronological order.

1.6.2 Arrange the activities of all cells into a single chronological order, allocate resources and schedule the times and dates when each activity will be carried out. These plans are preliminary and may be changed as a result of the following step.

1.6.3 Plan for decision making.

1.6.3.1 Identify decision makers.

1.6.3.2 Identify decisions to be made by the decision makers.

1.6.3.3 Determine when the decisions are going to be made.

1.6.3.4 Identify/develop the activities which, when observed, will provide the data needed to make the necessary decisions.

1.6.3.5 Develop plans for observing the activities.

1.6.3.6 Develop plans for reporting the data through observation.

1.6.3.7 Design the process to be used in decision making.

1.6.3.8 Review the decision making process.

1.6.3.9 Integrate the plans for observation, plans for reporting and the process for decision making into a cohesive plan for decision making.

1.6.4 Test the plan for decision making by constructing data which indicate satisfactory, unsatisfactory and grossly deficient performance of an activity and then apply the decision making process to make decisions, given the data.

1.6.5 Integrate the tested plan for decision making into the preliminary schedule of activities (1.6.2) making any needed adjustments in the allocation of resources or the scheduling of activities.

1.6.6 Evaluate.

In examining the above steps, the author realized that they were extremely impractical. The collective purpose of these steps was to develop a comprehensive plan for implementing the Methodology in a particular setting. This plan was not only to include the methodological

procedures to be employed, it was also to include a management component by which problems that may arise during implementation could be solved.

Such a plan has definite advantages. It provides the methodologist with a clear idea of what to do. It also provides the decision maker with a clear idea of what to expect. However, it is almost impossible to attempt to develop such a plan all at once because the development of such a plan would consume a tremendous amount of resources. The methodologist would have to acquire detailed and accurate information on each decision maker for whom the Methodology is to be applied. Such information would be needed in order to select appropriate procedures. The methodologist would also have to acquire detailed and accurate information on the environment in which the Methodology is to be applied. Such information would be needed so that the methodologist can plan for environmental changes that may necessitate revisions in the planned procedures.

A three part solution was developed in order to make the above steps practical. The first part of the solution involved the complete redesign of the above steps. The new steps provided for the development of a general rather than specific plan for implementing the Methodology for a particular decision maker. This plan did not include the methodological procedures to be used but rather documented when a decision maker would be available to implement each major process of the Methodology with respect to solving each problem that he/she was concerned about solving from within the problem area.

The methodological procedures to be used were developed in the second part of the solution. The second part of the solution has two elements. These two elements are the planning and evaluation steps of

each of the seven remaining major processes of the Methodology. In the planning step of each major process, the methodologist chooses or develops the specific procedures to be used to implement a given part of the Methodology. This is done by developing a specific agenda for working with a particular decision maker on a particular task at a particular time. This agenda not only includes the methodological procedures to be used, but it also contains strategies for providing the methodologist with feedback on the effectiveness of the procedures chosen.

In the evaluation step of each major process, the methodologist determines the effectiveness of the procedures that have just been implemented. The procedures are effective if they have accomplished the purposes for which they were designed or chosen. If they have not, then appropriate changes will be considered and, if necessary, carried out.

The third part of the solution is a cycling mechanism. Once the methodologist has completed a given amount of work with a particular decision maker, this mechanism cycles the methodologist back to a specific step within the planning process. The step to which the methodologist is cycled has him/her perform a number of tasks. First, the methodologist reviews the priorities of the decision makers that are available to work with the methodologist at that time. Second, the methodologist reviews the work that has been done with the highest priority available decision maker. Third, the methodologist offers that decision maker a number of options as to the next bit of work that could be done; and finally, once the decision maker has chosen the piece of work that he/she would like to do next, the methodologist proceeds to the planning step of the major process that corresponds to the chosen bit of work. Within

that planning step, the methodologist chooses the specific procedures that are required to carry out the chosen bit of work. Thus, this cycling mechanism shuttles the methodologist between the broad overview of what needs to be done to implement the Methodology in a particular setting and the specific methodological procedures that are to be carried out at any particular time during the contracting period.

The following format will be used to present the changes that have been outlined above. First, the new procedures that have been developed for implementing step 1.6 will be presented. Second, the specific sub-steps that have been developed for implementing the planning and evaluation steps for each of Decision Making Methodology's seven major processes will be presented.

1.6 Plan this application of the Methodology.

1.6.1 Plan the implementation of this step.

1.6.2 Cycle to major process 2.0 and use the steps of that process to identify the problems that the decision maker would like to solve during this application of the Methodology.

A more complete explanation of this step is found in section two. In that section, the procedures that have been developed for identifying problems are listed.

1.6.3 Allocate the resources available for implementing the Methodology to the problems that have been identified.

1.6.4 Divide the resources that have been allocated to each problem among the major processes of the Methodology.

1.6.5 Develop a time table for implementing the Methodology.

1.6.5.1 Choose the first/next problem for which a time table is to be developed.

1.6.5.2 Determine when the solution to that problem can/ should be implemented.

1.6.5.2.1 Identify the resources that have been allocated to the implementation of the solution.

1.6.5.2.2 Determine the earliest possible date at which the decision maker can begin to implement the solution.

1.6.5.2.3 Determine the latest possible date at which the implementation of the solution will have to be completed.

1.6.5.2.4 Identify those periods of time between these two dates during which the decision maker can provide the resources that have been allocated to the implementation of the solution.

1.6.5.2.5 If more than one period is identified, choose the one that the decision maker believes is most appropriate. This is a preliminary choice and may be changed as the details of the solution are developed.

1.6.5.2.6 Review the chosen period for conflict with critical activities that the decision

maker may be involved in at that time. These activities may or may not be related to the implementation of the Methodology.

1.6.5.3 Determine when each major process that needs to be carried out prior to the implementation of the solution can/should be carried out.

1.6.5.3.1 Choose the major process to be worked with. This major process should be the one that is either closest to the implementation of the solution or closest to the beginning of the last major process whose implementation has been planned.

1.6.5.3.2 Identify the resources that have been allocated to the implementation of this major process.

1.6.5.3.3 Have the decision maker identify that section of the contracting period during which he/she can provide the above resources. This section should be as close as possible to the beginning of the last major process that has been planned for.

1.6.5.3.4 Review the chosen period for conflict with critical activities that the decision maker may be involved in at that time. These activities may or may not be related to the implementation of the Methodology.

1.6.5.3.5 Recycle to 1.6.5.3.1 and repeat the last four steps until the implementation of each of the Methodology's major processes has been planned.

1.6.5.3.6 Have the decision maker review the overall plan for implementing the Methodology for this problem.

1.6.5.4 Determine when the effectiveness of the solution can be evaluated.

1.6.5.4.1 Identify the resources that are available for evaluation and redesign.

1.6.5.4.2 Determine the earliest date at which the implementation of the solution will most likely be finished.

1.6.5.4.3 Determine the latest date at which the decision maker will be available during the contracting period.

1.6.5.4.4 Determine periods of time between these two dates during which the decision maker can provide the resources that have been allocated to evaluation and redesign.

1.6.5.4.5 If more than one period is identified, have the decision maker choose the one that he/she believes is most appropriate. The period chosen should be as close as possible to the date on which the

implementation of the solution will be completed, and as far as possible from the end of the contracting period so as to allow for any needed redesign.

1.6.5.4.6 Review the chosen period for possible conflict with critical activities that the decision maker may be involved in at that time. These activities may or may not be related to the implementation of the Methodology.

1.6.5.5 Record the information generated in the last three steps into a time table for working with the decision maker on this particular problem.

1.6.5.6 Recycle to 1.6.5.1 and repeat the above steps for the rest of the problems that the decision maker would like to work on during this application of the Methodology.

1.6.5.7 Integrate the above information into a single plan which states at what times during the contracting period the decision maker will be available to implement each of the Methodology's major processes for each of the problems that he/she is concerned about solving from within the problem area.

1.6.5.7.1 Divide the contracting period into sub-periods.

1.6.5.7.2 Choose the first/next sub-period.

1.6.5.7.3 Determine all the work that has been planned during that sub-period.

1.6.5.7.4 Total the amount of resources that this work will require.

1.6.5.7.5 Recycle to 1.6.5.7.2 and repeat the last two steps for each sub-period from within the contracting period.

1.6.5.7.6 Present the above information to the decision maker and have the decision maker review it to make sure that the resources that have been agreed upon will actually be available at the times in question.

1.6.5.8 Ask the decision maker if he/she would like any other individuals or groups to examine or critique the overall plan. If so, identify these people and present the plan to them for their critique. Communicate the results of this critique to the decision maker and ask the decision maker to make any corrections that he/she believes are necessary.

1.6.5.9 Confirm the above plan with the contract decision maker.

1.6.6 Evaluate the effectiveness of this major step.

1.6.7 Choose the next piece of work to be done.

1.6.7.1 Determine the decision makers that are available at this time.

1.6.7.2 Choose the highest priority decision maker.

1.6.7.3 Confirm the availability of this decision maker.

1.6.7.4 If steps 1.6.1 through 1.6.6 have been carried out with the decision maker, then a plan for implementing the Methodology for that decision maker will have been developed. In this case, the methodologist should review the plan and compile a list of options as to those sections of the Methodology that can be carried out with the decision maker at this time. If steps 1.6.1 through 1.6.6 have not been carried out, then they should be implemented at this time.

1.6.7.5 Meet with the decision maker and present the options that are available as to the work that can be done at this time. Stress that an absolutely complete list of options is not being presented; therefore, the decision maker should feel free to suggest any other options that he/she believes are appropriate.

1.6.7.6 Have the decision maker choose the option that he/she believes is most appropriate.

1.6.7.7 Cycle to the planning step of the major process that contains the option chosen.

The procedures that have been developed for planning the implementation of the last six of Decision Making Methodology's eight major processes will now be presented. The numbering of these procedures is in accordance with the first major process in which they will be used. That major process is the third major process of the Methodology, "Determine a Statement of the Purpose With Respect to the Problem Area With

Which This Application of the Methodology Will Deal." These planning procedures are not to be used in major process two, "Perform a Needs Analysis," because other researchers (Coffing, Hodson and Hutchinson, 1973) have already done a substantial amount of work on planning the implementation of that major process. Because this work is fairly complete and reasonably operational, the author did not believe that it needed to be modified. Coffing's planning procedures have also been found to be effective when actually used.

3.1 Plan the implementation of this major process.

3.1.1 Compile the following information.

3.1.1.1 The amount of resources that are available to implement this major process.

3.1.1.2 A brief description* of the work that has already been done on the problem for which this major process is to be applied.

3.1.1.3 A brief description* of the procedures that may be used to implement this major process and the resources that may be allocated to each.

3.1.1.4 A brief description* of the major processes that remain to be implemented for this problem and

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*The length of these descriptions will depend upon such factors as the competence of the decision maker, the decision maker's understanding of the Methodology, and how much time has elapsed between meetings with the methodologist. If the methodologist has been working almost continuously with a very competent decision maker, who is well aware of the purpose and procedures of the Methodology, these descriptions will not have to be very long. However, more detailed descriptions may be needed if either the competence or understanding of the decision maker is in doubt or if a great deal of time has elapsed between meetings with the methodologist.

how the results of this major process will be used in successive major processes.

3.1.1.5 A brief description* of the contingencies under which the implementation of this major process could be halted or modified.

3.1.2 Arrange a meeting with the decision maker for the purpose of planning the implementation of this major process.

3.1.3 Meet with the decision maker and perform the following tasks:

3.1.3.1 Have the decision maker confirm his/her intention to continue working with the methodologist. If the commitment of the decision maker has changed, determine the problem. Once the problem has been identified, make a judgement as to whether or not it can be solved practically. If so, solve it; if not, stop work and inform the contract decision maker of the situation. The final resolution of the problem should be approved by the contract decision maker.

3.1.3.2 Have the decision maker confirm the amount of resources that are to be used in the implementation of this major process. If the planned amount of resources is inaccurate or impossible to provide, have the decision maker correct it and then

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*Ibid.

communicate this corrected amount of resources to the contract decision maker.

3.1.3.3 Present the decision maker with the brief description of the work that has already been done on the problem for which this major process is to be implemented. Check for the decision maker's understanding of the description. Answer as clearly and completely as possible any questions that the decision maker may have.

3.1.3.4 Present the decision maker with the brief description of the procedures that may be used to implement this major process and the resources that may be allocated to each. Check for the decision maker's understanding of the planned procedures. Answer as clearly and as completely as possible any questions that the decision maker may have. Have the decision maker confirm or modify the resources that have been allocated to the planned procedures.

3.1.3.5 Present the decision maker with the brief description of the major processes that remain to be implemented with this particular problem and explain how the results of the present major process will be used in successive major processes. Check to make sure that the decision maker understands these subsequent major processes and answer any

critical questions that the decision maker may have.

3.1.3.6 Describe to the decision maker the contingencies under which the implementation of this major process could be halted or modified. Check for the decision maker's understanding of these contingencies and answer as completely and as clearly as possible any questions that the decision maker might have.

3.1.3.7 Determine the specific dates on which the decision maker will be available to implement this major process.

3.1.3.8 Choose the first/next date.

3.1.3.9 Review the date to make sure that it does not conflict with any critical activities that the decision maker will be involved in at that time. If there is a conflict, determine if an alternative date can be decided upon for one of the conflicting activities. If an alternative date cannot be found, then the contract decision maker should be involved in the resolution of the conflict.

3.1.3.10 Have the decision maker confirm the date and, if possible, set an alternative date.

3.1.3.11 Develop the agenda to be followed with the decision maker on the chosen date. This agenda should

include the methodological procedures to be used. The agenda should be as complete as possible, given the available resources. The last two procedures of the agenda should provide for evaluation and redesign and for cycling the methodologist back to step 1.6.7 where he/she will choose the next piece if work to be done.

3.1.3.12 Review the agenda.

3.1.3.13 Plan for providing feedback on the effectivenexx of the agenda ss it is being implemented.

3.1.3.14 Implement the agenda.

The procedures that have been developed for evaluating the effectiveness of the last six of Decision Making Methodology's eight major processes will now be presented. The numbering of these procedures is in accordance with the first major process in which they will be used. That major process is the third major process of the Methodology, "Determine a Statement of the Purpose With Respect to the Problem Area With Which This Application of the Methodology Will Deal." These evaluation procedures are not to be used in major process two, "Perform a Needs Analysis" because other researchers (Coffing, Hodson and Hutchinson, 1973) have already done a substantial amount of work on evaluating the effectiveness of that major process. Because this work is fairly complete and reasonably operational, the author did not believe that it needed to be modified. Coffing's evaluation procedures have also been found to be effective when actually used.

3.9 Evaluate the implementation of this major process.

3.9.1 Determine the resources that are available for evaluation.

3.9.2 Allocate these resources among the procedures of this step.

3.9.3 Develop the evaluation criteria.

3.9.3.1 If the resources are small, then the purpose of the procedures that have just been implemented will serve as their evaluation criterion. In this case, the methodologist should cycle to 3.9.7.

3.9.3.2 If the resources are large, then the purpose of the procedures that have just been implemented should be operationally defined. These operational components will serve as the evaluation criteria. If this approach is followed, the methodologist should operationalize the purpose and then proceed to the next step.

3.9.4 Prioritize the evaluation criteria.

3.9.5 Allocate the resources for measurement among the prioritized criteria.

3.9.6 Choose the first/next criterion.

3.9.7 Determine if data needs to be gathered on the accomplishment of this criterion. This determination may be made by examining the results of the procedures that have just been implemented. If the methodologist believes that such an examination is sufficiently thorough enough to enable

a determination to be made as to whether or not the criterion has been accomplished, then no additional data needs to be gathered. In this case, the methodologist should proceed to 3.9.6.

3.9.8 Gather the data that must be acquired in order to determine if the evaluation criterion has been satisfied.

3.9.9 Review the data.

3.9.10 Make any necessary changes.

3.9.11 Recycle to 3.9.5 and repeat the last four steps for the remaining evaluation criteria.

3.9.12 If the decision maker and the methodologist agree to it, make the evaluation data and resultant changes available to other decision makers who may be interested in the problem and/or to other methodologists who may be interested in the Methodology.

3.9.13 If resources and desire permit, perform an evaluation of the evaluation.

Gaps Identified in Major Process 2.0:
Perform a Needs Analysis

2.0 Perform a needs analysis.

2.1 Plan the implementation of this step.

2.2 Determine the needs which are of concern to the decision maker.

2.3 Define the need which the decision maker is interested in meeting.

2.4 Report the definition of the need to the decision maker.

2.5 Measure the degree to which the definition of the need is being met.

2.6 Report the results of the measurement to the decision maker.

2.7 Evaluate/Redesign.

The above steps are incomplete. None of them contain specific sub-steps for their implementation. The incompleteness of these steps is a critical gap in the Methodology because these steps are some of the Methodology's most important procedures. The problems to be solved during a given application of the Methodology are identified through the use of a needs analysis. A problem is defined as an unmet need that a decision maker is very concerned about meeting. If the procedures for performing the needs analysis are not reasonably complete, it may be very difficult to accurately identify the problems that the decision maker would like to solve. If problems cannot be identified, the rest of the Methodology cannot be implemented. To fill this gap, the author developed a more complete set of procedures for performing the needs analysis. The procedure that were developed are as follows:

2.0 Identify problems. The following procedures are a short form version of the Coffing/Hutchinson Needs Analysis Methodology (Coffing, 1973). If resources permit, the long form of these procedures should be used.

2.1 Plan the implementation of this major process.

2.1.1 Determine the resources that are available for implementing this major process.

2.1.2 Allocate these resources among the steps of this major process according to the following percentages. These percentages are based on percentages developed by Coffing (Coffing, 1973).

--Fifty percent to step 2.2

--Fifteen percent to step 2.3

--Thirty percent to step 2.4

--Five percent to steps 2.5 through 2.8

2.1.3 Confirm the allocation with the decision maker for whom this major process is to be applied.

2.1.4 Proceed to step 2.2.

2.2 Determine the decision maker's concerns about who needs what according to whom with respect to the problem area of this application.

2.2.1 The methodologist asks the decision maker to write in a list of his/her responses to the question, "Who are the individuals or groups involved in this problem area whose needs are important to you?"

2.2.2 The methodologist asks the decision maker to write in a list of his/her response to the question, "For these persons or groups, what kinds of needs are important to you?"

2.2.3 The methodologist asks the decision maker to write

in a list of his/her responses to the question, "Given the persons and needs on your two lists, who would be able to specifically define the needs?"

2.2.4 Test the completeness of the decision maker's responses.

2.2.4.1 Identify those people whose responses to the above questions would prove helpful.

2.2.4.2 Acquire the responses of those people.

2.2.4.3 Present the responses to the decision maker and allow him/her to make any changes in the original lists that he/she believes are necessary.

2.2.5 The decision maker picks the most important entries on each list.

2.2.6 Using the above information, the methodologist constructs sentences in the form of "who needs what according to whom."

2.2.7 The decision maker prioritizes the sentences constructed.

2.2.8 The decision maker chooses the first/next sentence.

2.2.9 The decision maker is asked to review the sentence to make sure that he/she is committed to having defining and measurement done on that sentence.

2.2.10 The decision maker confirms the sentence with any other appropriate individuals or groups that he/she wishes to.

2.2.11 The methodologist secures the cooperation of needers and definers.

2.3 Define whose needs for what according to whom.

2.3.1 Develop the defining stimulus.

2.3.1.1 The methodologist asks the decision maker to state the decision maker's purpose for obtaining data in relation to this sentence.

2.3.1.2 The methodologist develops a hypothetical situation appropriate to the decision maker's stated purpose.

2.3.1.3 The methodologist inserts the who and the what into the situation.

2.3.1.4 The methodologist determines how the definer should observe the situation.

2.3.1.5 The methodologist uses the above information to construct a defining stimulus of the following form: "Imagine (the hypothetical situation), and in that situation imagine that (name of the needer)'s needs for (need being defined) are fully met. Observe that situation (in the manner specified in step 2.3.1.4). What are all the things that you see in the situation that indicate to you that (name of the needer)'s needs for (type of need being defined) are fully met?"

2.3.1.6 The methodologist asks the decision maker

to approve the defining stimulus. If the stimulus is not satisfactory, then the methodologist should change it so that it is. Changes made should be determined by the decision maker.

2.3.2 Have the definer respond to the defining stimulus.

2.3.2.1 Set up a meeting with the definer.

2.3.2.2 Have the definer respond to the stimulus.

2.3.2.3 Record the definer's responses.

2.3.2.4 Have the definer prioritize his/her responses on the basis of importance.

2.3.2.5 Check the prioritized components for clarity.

2.3.2.6 If the resources permit, further operationalize fuzzy components starting with the one having the highest priority.

2.3.2.7 If the resources permit, have the definer prioritize any new responses.

2.3.2.8 Record all problems encountered in the defining process as well as any additional comments made by the definer regarding the need or the process.

2.3.3 Report the definer's definition to the decision maker.

2.3.3.1 Write the report.

2.3.3.1.1 Compile the results of the defining process.

2.3.3.1.2 Write a statement of the procedures

used to obtain the definition.

2.3.3.1.3 Document all difficulties, problems or limitations encountered in the process.

2.3.3.1.4 Compile the above in the following sequence: who what whom sentence, stimulus, procedures, definition, and problems.

2.3.3.2 Present the report to the decision maker offering to answer any questions.

2.4 Measure the degree to which the definition of the need is being met.

2.4.1 Choose the components to be measured.

2.4.2 Test the completeness of the list of components chosen.

2.4.3 Prioritize the chosen components.

2.4.4 Review the prioritized components to make sure that the decision maker is committed to measuring these components.

2.4.5 Confirm the prioritized components with any relevant others chosen by the decision maker.

2.4.6 Allocate the measurement resources to the chosen components.

2.4.7 Review the allocation.

2.4.8 Choose the first/next component to be measured.

2.4.9 Determine on the basis of available resources whether the component is to be measured using short form

procedures or long form procedures. If short form procedures are to be used, proceed to 2.4.10. If long form procedures are to be used, proceed to 2.4.11.

2.4.10 Ask the definer to estimate the degree to which the component is met.

2.4.11 Actually measure the extent to which the component is being met.

2.4.11.1 Conceptualize the ideal measurement technique. An ideal measurement technique has the following characteristics: It permits direct observation of the component. This means that the technique enables the observer to actually see or hear the occurrences of the component. It permits observation of the component under natural conditions. This means that the technique does not impose conditions or present stimuli other than those that are normally present in the situation being observed. Finally, the ideal measurement technique is unobtrusive. This means that the technique does not cause the persons being observed to be aware of the fact that they are being observed.

2.4.11.2 Review the ideal technique.

2.4.11.2.1 Is it practical? If yes, proceed to the next step. If not, proceed to 2.4.11.4.

2.4.11.2.2 Does the ideal technique already exist? If so, go to 2.4.11.5. If not, proceed to the next step.

2.4.11.3 Design the ideal technique.

2.4.11.4 Design the practical observation technique by modifying the ideal technique so that it can be implemented within the available resources.

2.4.11.5 Design the sampling plan.

2.4.11.6 Design the recording device.

2.4.11.7 If possible, field test the recording device and observational technique.

2.4.11.8 Report the measurement plan to the decision maker for final approval or modification.

2.4.11.9 Implement the measurement plan.

2.4.11.10 Report the measurement results to the decision maker.

2.4.11.11 Have the decision maker decide whether or not the component that was measured is a problem that he/she would like to solve using the Methodology.

2.5 Recycle to 2.2.8 and repeat the defining and measuring

process for any other sentences that the decision maker would like to examine.

2.6 Prioritize all problems that have been identified through the above steps.

2.7 Evaluate the implementation of this major process.

2.8 Cycle back to step 1.6.7 and choose the next piece of work to be done.

Gaps Identified in Major Process 3.0:
Determine a Statement of the Purpose with Respect to the Problem Area with Which This Application of the Methodology Will Deal

3.2 The decision maker chooses the component(s) of what need(s) are to be met using the Methodology.

In this step, the decision maker chooses the problems that he/she would like to solve using the Methodology. In this decision making methodology, a problem is defined as an unmet need or unmet need component that a decision maker is interested in meeting. However, the above step is redundant; it asks the decision maker to repeat an activity that has already performed. The new version of step 1.6 contains a specific substep, 1.6.2, in which the decision maker identifies the problems to be solved. Because the above step is redundant, it was deleted from the Methodology.

3.3 If the decision maker chooses to meet a set of need components that cannot be logically combined into a single purpose statement, then a separate application matrix is made for this decision maker. The only change in the matrix will be in the labelling of the horizontal axis (1.6.1.2). Instead of containing the names of decision makers, it will contain the names of the need components to be met.

The above step is essentially a planning mechanism specifically developed for a decision maker who wants to solve more than one problem from within a problem area. For such a decision maker, a separate application matrix is developed for each problem that the decision maker is interested in solving. However, previous changes have made the above step unnecessary. The new version of step 1.6, the step in which the application of the Methodology is planned, does not include the development of an application matrix. The concept of an application matrix as a planning mechanism was questioned and finally abandoned because it would be impractical to develop. The impracticality of developing an application matrix was discussed in detail when the new version of step 1.6 was presented. Because the above step is unnecessary, it was deleted from the Methodology.

3.4 The decision maker determines what is presently known about the need which is to be met by performing any combination of

the following tasks:

3.4.1 Read literature which relates to the need.

3.4.2 Talking to people whose work is involved in meeting the need.

3.4.3 Examine actual efforts to meet the need.

3.4.4 Talk to people who are or have been effected or served by efforts to meet the need.

3.4.5 Talk to people who at one time were involved in meeting the need but who have discontinued their involvement.

3.4.6 Think about the need.

3.4.7 Try out tools that already exist for meeting the need.

Two major gaps were identified in the above step. The first involved practicality. The second involved necessity. The necessity of the above step may be questioned if a decision maker already has a comprehensive understanding of most of the information that already exists on solving a particular problem. True, a knowledgeable decision maker may want to increase his/her knowledge; however, before additional information is acquired, the benefits should be balanced against the costs. For a decision maker who is relatively uninformed, the benefits would normally outweigh the costs. However, for a well informed decision maker, the opposite may be true. In order to fill this gap, it is recommended that the above procedures be redesigned so that they provide for first identifying the information that the decision maker already possesses with respect to solving a particular problem and then analyzing that

information with respect to such factors as its breath, its timeliness, the expertise of the individual or group who produced it, and the nature of the methods used to generate it. The recommended procedures were not designed during the course of this study because the author believed that they would not be difficult to design.

The above procedures are impractical because they could very easily consume a great deal of the decision maker's resources. This is possible because the above procedures require the decision maker to carry out those activities that might expand his/her understanding of a particular problem. It might be a more efficient use of the decision maker's resources if the methodologist acquired information from sources identified by the decision maker. This could be done by having the decision maker identify the types of information that he/she needs, generate a list of alternative sources from which this information might be acquired, prioritize these sources on the basis of such criteria as the availability of the source, the practicality of obtaining information from the source, the probability that the source will produce information that the decision maker will actually use, the amount of information that the source possesses, the nature of the methods used by the source to acquire the information o the timeliness of the information. Having done this, the decision maker and the methodologist could then develop plans for acquiring information from the sources according to their priorities. Using this approach, the methodologist would do the acquisition while the decision maker would determine the specifics of what is to be acquired. The decision maker would also determine how and from where the information is to be acquired. Specific procedures were not designed to fill this gap because the above description may be viewed as a basic outline of the changes that need to be made.

3.8 Test the chosen purpose.

3.8.5 Is the purpose ethical?

3.8.5.1 Is the purpose consistent with the methodologist's value system?

3.8.5.2 Will the purpose, when accomplished, promote the general welfare?

3.8.5.3 Revise the purpose until it is ethical with respect to the above standards.

The above steps did not provide for testing the purpose against the decision maker's value system. It is possible that in the pressure of having to solve a particular problem, the decision maker may draft a purpose that violates one of his/her high priority personal values. The possibility of such a conflict should be considered; and if such a conflict is discovered, it should be resolved. If it went unresolved, there might be a significant decrease in the respect that the decision maker has for him/herself, for his/her employers, for his/her clients, and possibly for the methodologist and the Methodology. To fill this gap, the following changes were made.

3.8.5 Is the purpose ethical?

3.8.5.1 Is the purpose consistent with the decision maker's value system?

3.8.5.2 Is the purpose consistent with the methodologist's value system?

3.8.5.3 Will the purpose, when accomplished, promote the general welfare?

3.8.5.4 Revise the purpose until it is ethical with respect to the above standards.

3.8.6 Is the purpose desirable? Will a solution to accomplish this purpose be actually used? If the purpose is not desirable, revise it until it is.

In examining the wording of the above step, the author realized that it did not specify to whom the purpose is to be desirable. Is it the intention of this step to determine whether or not the purpose is desirable to the decision maker? It is unnecessary to do so because it was already determined whether or not the purpose carried the decision maker's commitment. The author believes that a decision maker would not freely commit him/herself to a purpose that was personally undesirable. Therefore, the above step may be redundant if its intention is to check to see if the purpose is desirable to the decision maker.

In examining the above step, the author realized that its intention was not to determine if the purpose was desirable to the decision maker but rather its intention was to determine whether or not the purpose would have any serious negative consequences on those who might participate in or be effected by a solution designed to accomplish it. An ideal purpose is one that has absolutely no negative consequences at all on anybody. Although such a purpose is very difficult to develop, every

effort should be made to do so. To fill this gap, the author redesigned the above step. The revised version appears below.

3.8.6 Determine if the purpose will have any serious negative effects on those who might participate in or be effected by a solution to accomplish it. If the purpose will produce such effects, change it so that they are eliminated or minimized.

Gaps Identified in Major Process 4.0:
Conceptualize the Ideal Solution

4.0 Conceptualize the ideal solution.

4.2 Develop a preliminary list of ideal solutions.

4.2.1 Define the term "ideal solution."

4.2.2 Develop a list of solutions consistent with the definition.

When the above steps were originally developed, the author assumed that different decision makers would have different definitions of the term "ideal solution." If this assumption were true, then one of the initial steps in the conceptualization of an ideal solution should be obtaining a decision maker's definition of the term "ideal solution." If this were not done, the solution that was conceptualized in this major process would most likely not be ideal, at least not according to the decision maker's definition.

In examining the above step, the author realized that the assumption on which it was based may only be true in a very limited number of cases. This author has worked with few decision makers who have significantly different definitions of the term "ideal solution." Most of the decision makers with whom this author has worked, and these decision makers are a reasonably diverse group with respect to age, sex and institutional position, hold a common definition of an ideal solution. These decision makers define an ideal solution as one which has been designed for a situation in which there are unlimited resources.

If most decision makers hold a common definition of an ideal solution, then developing such a solution may simply involve having them conceptualize a solution that is consistent with that definition. It may be unnecessary to first "define the term ideal solution" and then develop a solution that is consistent with that definition. In order to solve this problem, the following corrections were made:

4.0 Conceptualize the ideal solution.

4.2 Develop a list of alternative ideal solutions.

4.2.1 Record the decision maker's response to the following stimuli: "Imagine a situation in which you have unlimited resources. How might you accomplish your purpose in such a situation?" "Imagine that at this very moment you have access to unlimited resources. How would you use these resources to accomplish your purpose if you were to accomplish it right now?"

4.2.2 Repeat the above step for situations in which there are unlimited amounts of certain types of resources

such as money, time, curricular material, instructional hardware, personnel, space, etc.

4.3 Develop a list of usual solutions.

4.4 Develop a final list of ideal solutions.

4.4.1 Examine each usual solution in the light of the definition of an ideal solution.

4.4.2 Change each usual solution so that it is consistent with the definition of an ideal solution.

4.4.3 Combine the results from above with the preliminary list of ideal solutions.

4.4.4 Test the above list for completeness using systems logic and any other appropriate test of completeness.

In Version III of Decision Making Methodology, the above steps were used to test the completeness of a list of ideal solutions. The completeness of the list was tested by first generating a series of usual solutions and then changing these usual solutions so that they are consistent with the decision maker's definition of the term "ideal solution." Changing step 4.2.1 necessitated changing these steps because in the new version of step 4.2.1, a decision maker is no longer asked to define the term "ideal solution." Thus, a list of usual solutions cannot be made ideal by modifying them so that they are consistent with a decision maker's definition because the definition was not developed in the first place. However, a list of usual solutions could be made ideal by having the

decision maker change them so that they would be consistent with a situation in which there are unlimited resources to implement them. Changing the above steps in this way would make them consistent with the new version of step 4.2.1. The changes that were made appear below.

4.2.3 Test the completeness of the decision maker's list of alternative ideal solutions by doing any one or combination of the following things:

4.2.3.1 Have others repeat the last two steps.

4.2.3.2 Read utopian, critical or futuristic literature on the problem area.

4.2.3.3 Make usual solutions ideal solutions.

4.2.3.3.1 Develop a list of usual solutions for this purpose.

4.2.3.3.1.1 Write down all the ways that you could accomplish this purpose.

4.2.3.3.1.2 Write down all the ways that you could fail to accomplish this purpose and then state them positively so that they are ways of accomplishing the purpose.

4.2.3.3.1.3 If you were actually accomplishing the purpose, what would you be doing?

4.2.3.3.1.4 Write down all the unusual ways of accomplishing the purpose.

4.2.3.3.1.5 Combine all responses into a single list of solutions.

4.2.3.3.1.6 Test this list for completeness.

4.2.3.3.2 Develop a list of usual solutions to similar purposes or problems.

4.2.3.3.2.1 Develop a list of problems or purposes which are similar to this one.

4.2.3.3.2.2 Of the problems identified, determine which ones have actually been dealt with by the decision maker and which have not.

4.2.3.3.2.3 For the ones which have been actually dealt with, complete the following sentences.

4.2.3.3.2.3.1 State how you solved the problem if you dealt with it successfully. Can you state any other ways of solving the problem? If so, state them.

4.2.3.3.2.3.2 State how you

failed to solve the problem if you dealt with it unsuccessfully. Can you state any other ways in which you could have failed to solve the problem? If so, state them and then make them positive so that they may be considered as ways of solving the problem.

4.2.3.3.2.3.3 State any unusual ways in which you could have solved this problem.

4.2.3.3.2.4 For the problems that have not been actually dealt with, complete the following sentences.

4.2.3.3.2.4.1 Write down all the ways in which this problem could be solved.

4.2.3.3.2.4.2 Write down and then negate all the ways by which you could have failed to solve the problem.

4.2.3.3.2.4.3 Write down what you would be actually doing if you were solving the problem.

4.2.3.3.2.4.4 Write down all the unusual ways in which you could solve the problem.

4.2.3.3.2.5 Combine all the above responses into a single list.

4.2.3.3.2.6 Test the list for completeness.

4.2.3.3.3 Develop a list of solutions to problems that have nothing to do with the original problem.

4.2.3.3.3.1 Develop a list of problems that have nothing to do with the original problem.

4.2.3.3.3.2 For each of the above problems, write out all the ways you could solve the problem.

4.2.3.3.3.3 For each of the above problems, write out all the ways in which you could fail to solve the problem and then state them positively.

4.2.3.3.3.4 If you were actually solving the problem, write down what you would be doing.

4.2.3.3.3.5 Write down all the unusual ways of accomplishing the problem.

4.2.3.3.3.6 Combine all the above into a single list.

4.2.3.3.3.7 Test the list for completeness.

4.2.3.3.4 Combine all the above lists (4.2.3.3.1.6/4.2.3.3.2.6/4.2.3.3.3.7) into a single list of usual solutions.

4.2.3.3.5 Have the decision maker review the list and discard any solutions that he/she believes would not accomplish the original purpose.

4.2.3.3.6 Choose the first/next usual solution that will be made into an ideal solution.

4.2.3.3.7 Make the chosen solution an ideal solution by modifying it in light of a situation in which there are unlimited resources available for its implementation.

4.2.3.3.8 If resources permit, have the decision maker modify the usual solution in light of a situation in which there are unlimited amounts of specific types of resources such as time, money, personnel, curricular material, instructional hardware, etc.

4.2.3.3.9 Recycle to step 4.2.3.3.5 and repeat the last two steps for as many of the usual solutions as possible.

4.2.3.4 Have the decision maker review these additional lists of ideal solutions and make any changes in the original list of ideal solutions that he/she believes are necessary.

4.5 Choose the most appropriate ideal solution.

- 4.5.1 Develop the criteria on which the selection will be made.
- 4.5.2 Choose the alternatives to be tested.
- 4.5.3 Prepare the chosen alternatives for testing.
- 4.5.4 Choose the activities to be tested.
- 4.5.5 Plan for testing.
- 4.5.6 Implement the plan for testing.
- 4.5.7 Evaluate.

The above procedures are essentially a mechanism for field testing a set of alternative ideal solutions. When these procedures were originally developed, the author believed that field testing, when done rigorously, would provide a decision maker with highly reliable information concerning the effectiveness of a set of alternative ideal solutions. Nothing has changed that belief. However, there is a problem. Field testing is costly--very costly. In fact, the most costly type of field test may well be one in which an ideal solution is being examined.

Field testing an ideal solution can be so costly because an ideal solution is very costly to implement; and if an ideal solution is to be field tested, it must be implemented, at least in part. An ideal solution is, at least according to this Methodology, a solution that has been designed for a situation in which there are unlimited resources available for designing and implementing the solution. In such a situation, a

decision maker may very well come up with a solution which requires unlimited resources to be carried out. However, decision makers usually operate in "real" rather than "ideal" environments and will therefore, in all likelihood, have only a limited amount of resources to carry out this step. Usually, the only way that an ideal solution can be field tested is to test parts of it. This approach will provide the decision maker with incomplete though highly reliable data. The data will be reliable because it will have been generated through field testing as opposed to such less rigorous techniques as modelling or simulation. The data will be incomplete because it does not reflect an examination of the entire solution. It only reflects the examination of specific solution parts. Thus, field testing is not a panecea; it has its strengths and weaknesses, even though in theory it is a very effective way of choosing among alternative solutions to a particular problem.

Given this problem, the above step is incomplete. A wider range of options, field testing being one of them, should be available to a decision maker for the purpose of choosing the most appropriate ideal solution. To solve this problem, the above step was completely redesigned. The new version contains a variety of selection procedures. These procedures include estimating the probability of success for each of the alternative solutions, having experts estimate the probability of success for each of the alternative solutions (this procedure is normally referred to as the Delphi technique), modelling, simulation, and finally field testing. These options do not represent an absolutely complete list of the available selection techniques. What these options do represent is a series of techniques that the author believes could be used effectively

in a variety of situations, each of which differs with respect to the amount of resources that is available for the selection process. Estimating the probability of success for each of the alternative solutions might be effective in a "low" resource situation. On the other hand, field testing the alternative solutions would be much more effective if a relatively large amount of resources were available for the selection process. When the resources are neither very large nor quite small, techniques such as Delphi, modelling or simulation could be employed. At this point in the Methodology's development, the amount of resources needed for each selection technique has not been operationally defined. This represents a gap in these procedures. The author did not fill this gap due to resource limitations.

The decision maker chooses the selection technique to be used. The decision maker selects the technique that he/she believes will work best, given the available resources. This selection is made after each technique has been explained to the decision maker by the methodologist. The methodologist's explanation is critical. In this explanation, the methodologist will use his/her understanding of the selection techniques to describe the type and the amount of data that can be expected to be generated by each technique. It is important to note that in this description, the methodologist is explaining and not prescribing; the methodologist is instructing rather than advertising. The methodologist should not, in any way, coerce the decision maker into using a selection technique to which the decision maker is not committed.

Procedures have been developed for implementing two of the selection techniques. These techniques are estimating the probability of

success for each of the alternative solutions and field testing the alternative solutions. Procedures were developed for implementing these options because the development of such procedures was practical. The author has had experience in the design and utilization of these two techniques, and this experience was called upon in the development of procedures for their implementation. This was not the case with respect to the selection techniques of modelling, simulation and the Delphi procedure. The author does not have extensive experience in the utilization of these techniques and before procedures for their implementation could be developed, he/she would have to investigate each of these techniques thoroughly. Because the author did not have the resources necessary to do a rigorous analysis of these techniques, procedures for their implementation were not developed. However, the author has included under each of these techniques references as to where a methodologist or a reader might find a general outline of the procedures necessary for their implementation. What appears below is the new version of the set of steps for selecting the most appropriate ideal solution.

4.3 Choose the most appropriate ideal solution.

4.3.1 Determine the resources that are available for the selection process.

4.3.2 Allocate these resources among the solutions to be examined.

4.3.3 If only a very small amount of resources are allocated to each alternative solution, the decision maker may want to do either or both of the following things:

4.3.3.1 Narrow the list down so that a larger amount

of resources can be allocated to each alternative solution.

4.3.3.2 Acquire additional resources so that a larger amount of resources can be allocated to each alternative solution.

4.3.4 Allocate the resources for each alternative among the activities of the selection processes that are documented in steps 4.3.8 through 4.3.12.

4.3.5 The methodologist examines the allocation and then describes to the decision maker the type of results that can be expected to be generated by each of the selection processes. This description should not be judgemental. It should be informative. It should outline, as objectively and as completely as possible, the type and amount of data that can be expected to be generated by each selection process, given the resources that are available to implement the respective processes.

4.3.6 The decision maker selects the process that he/she believes will be most effective. This selection can be based on such criteria as the degree to which the solutions are fully developed during the selection process. A process that operationally defines the solution is advisable to one that does not develop the solution past the level of a general descriptive statement. Another criteria that could be used is the extent to which the selection process provides for the actual implementation

of the solution. A process in which the solution is actually carried out to determine its ability to accomplish the decision maker's purpose is advisable to one in which the effects of implementing the solution are imagined rather than observed directly.

4.3.7 Proceed to the set of steps that provide for implementing the chosen selection process. Step 4.3.8 should be used if estimating the probabilities of the success of the alternative solutions was the process chosen; step 4.3.9 should be used if the Delphi technique was the process chosen; step 4.3.10 should be used if modelling was the process that was chosen; step 4.3.11 should be used if simulation was the process that was chosen; and step 4.3.12 should be used if field testing was the process that was chosen.

4.3.8 Estimate the probabilities of success for each of the alternative solutions.

4.3.8.1 Generate the criteria against which the alternatives will be measured by having the decision maker perform the following activities:

4.3.8.1.1 Imagine a hypothetical situation in which your purpose has just been accomplished. All the people, places, objects, etc. involved with your purpose are in this situation; this includes yourself. Look at this situation;

observe it very carefully. On a separate piece of paper, put down all the events, actions and verbalizations that tell you that your purpose has been accomplished.

4.3.8.1.2 If resources allow, have other people do the above and use their input to make changes on your original list.

4.3.8.1.3 If resources allow and you have never had a similar problem before, think up all the criteria that you used then to tell yourself that you had successfully accomplished this similar problem. Check your original list to see if each of your criteria is on the list; for any criteria that are not on the list, add them to the list.

4.3.8.1.4 Check through the list and for each criteria, decide if it is truly a criteria for you; that is, if this criteria does not happen, does that really tell you that your purpose has failed? Cross off any criteria that do not pass this test.

4.3.8.1.5 Choose the six most important criteria on your list. That is, choose those

criteria that tell you more than any others that your purpose is accomplished. If there are more than six, then do not stop at six but try to choose at least six.

4.3.8.2 Construct a selection matrix.

4.3.8.2.1 Count the number of alternatives to be examined.

4.3.8.2.2 Count the number of selection criteria to be used.

4.3.8.2.3 Construct a matrix whose number of rows equals one plus the number of alternative solutions and whose number of columns equals one plus the number of selection criteria.

4.3.8.2.4 Invent a short name for each alternative solution.

4.3.8.2.5 Enter these names in the first column of the matrix starting with the second cell in that column. There should be one alternative per cell.

4.3.8.2.6 Invent a short name for each selection criteria.

4.3.8.2.7 Enter these names in the first row of the matrix starting with the second cell in that row. There should be one criterion per cell.

4.3.8.3 Measure the alternatives against the selection criteria.

4.3.8.3.1 Take the first alternative solution and look at it in relation to the criteria for accomplishing the purpose.

4.3.8.3.2 For each criterion, decide whether the solution is likely to accomplish that criterion and put an "L" in the appropriate cell of the matrix if it is likely to (that is, the chance is greater than fifty percent as you estimate it). You must estimate how probable this is based on your perceptions of the solution. Put an "N" in the appropriate cell of the matrix if the solution is not likely to meet the criterion.

4.3.8.3.3 For each criterion for which there is an "L" under the solution, determine the probability that the solution will accomplish each of these criteria. Because you put an "L" in the cell, the probabilities will be greater than or equal to .5.

4.3.8.3.4 For each criterion for which there is an "N" under the solution, determine

the probability that the solution will accomplish this criterion. This probability should be less than or equal to .49.

4.3.8.3.5 Do this process for each of the solutions listed in the matrix. If the resources are short, prioritize the solutions as to the ones you feel most likely to accomplish the purpose and then do the above process for as many of the solutions as possible, according to their priority order.

4.3.8.3.6 If resources allow, have other persons perform the above steps and then use their input to revise your probabilities if you believe that such revision is warranted.

4.3.8.4 Choose the most appropriate solution.

4.3.8.4.1 Choose the first solution listed on the matrix.

4.3.8.4.2 Total the probabilities of that alternative, meeting each of the selection criteria.[1]

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[1] In the above process, the selection of the most appropriate solution is not made on the basis of weighted criteria. Procedures for using weighted criteria were not developed during the course of this study because the author believed that the above steps were adequate for estimating the probabilities of success for each of the alternative solutions. However, when this step is more fully developed, procedures could be added for the use of weighted criteria.

4.3.8.4.3 Repeat the above two steps for each alternative listed in the matrix.

4.3.8.4.4 Choose that solution whose total is the highest.

4.3.9 Choose the most appropriate solution through the use of the Delphi technique. A general outline of the procedures necessary to implement this technique can be found in any one of the following sources: The Delphi Method, Substance Context, A Critique and an Annotated Bibliography (Pill, 1971), The Delphi Method and Urbanization (B. Marley-Clark, 1974), or Personnel Administration in 1980: A Delphi Study (Lackmann, 1972).

4.3.10 Use modelling to choose the most appropriate solution: A general outline of the procedures necessary to construct a model may be found in any one of the following sources: Visualizing Change, Model Building and the Change Process (Lippitt, 1973), Work Design: A Systems Concept (Nadler, 1970), An Organizational Management (Michael and Jones, 1973).

4.3.11 Choose the most appropriate solution through the use of a simulation process. A general outline of the procedures necessary to carry out simulations may be found in any one of the following sources: Handbook of Games and Simulation Exercises (Gibbs, 1974), and Simulation and Gaming in the Social Sciences (Inbar, 1972).

4.3.12 Field test the alternative solutions.

4.3.12.1 Allocate the resources among the alternatives to be field tested.

4.3.12.2 Allocate the resources for each alternative among the procedures of this step.

4.3.12.3 Determine when the alternatives are to be field tested. This is a preliminary determination and may change as the alternative solutions become more clearly defined.

4.3.12.4 For each alternative, determine when the details of the field test are to be worked out. The decision maker should identify a period of time prior to implementation of the field test during which the procedures of this step up to but not including 4.3.12.26 can be carried out.

4.3.12.5 Choose the first/next alternative solution for which the details of the field test are to be worked out.

4.3.12.6 Design the major elements of the solution.

4.3.12.6.1 Develop an initial list of major elements.

4.3.12.6.1.1 Imagine and write down all the ways in which you could implement this alternative solution avoiding all problems.

4.3.12.6.1.2 Imagine and write down in what ways you could fail to

implement this alternative solution.

4.3.12.6.1.3 Imagine the solution being implemented; write down what is happening.

4.3.12.6.1.4 Think up elements that have nothing to do with implementing the solution and consider whether they do or not.

4.3.12.6.1.5 Create one list from all the lists generated in the previous steps. For the elements generated in 4.3.12.6.1.2, change their statements so that they describe an element that could be used in the implementation of the solution.

4.3.12.6.2 Test the completeness of the list of major elements by performing any combination of the following activities:

4.3.12.6.2.1 Have others perform the previous steps. Examine their responses and decide if their list of elements contains elements that you would like to add to your original list. If so, do so.

4.3.12.6.2.2 Think up alternative to your original list of elements and then consider if these alternatives should be added to your original list. Make any additions that you believe are appropriate.

4.3.12.6.2.3 Think up unusual ways of implementing the alternative solution and then consider if these items could be one of the solution's major elements. If you believe that they can, you should add them to your original list of major elements.

4.3.12.7 Examine your list of major elements and discard any that you believe are not necessary for the implementation of the solution.

4.3.12.8 Arrange the major elements in the order in which they would be implemented if the alternative solution were actually being carried out.

4.3.12.9 Have the decision maker review the list of elements to make sure that he/she has a clear idea of what each element means, that there is a logical flow from one element to another, and that critical elements are not missing from the list.

This review may give the decision maker an insight into the possible effectiveness of a particular alternative solution. If this insight indicates to the decision maker that the alternative would be clearly ineffective or at best much less effective than some other alternative, the decision maker may want to halt the field testing of this alternative and allocate the resources remaining for the testing of this alternative to some other section of the Methodology or to some other problem that is of concern to the decision maker.

4.3.12.10 Confirm the elements with any other individuals or groups whom the decision maker may choose on the basis of law, policy or personal preference. This procedure provides the decision maker with the option of offering the solution's list of elements to others for their critique. Their comments may give the decision maker the same insight that may have been gained in the previous step; that is, an insight into the solution's effectiveness. If such an insight is gained, then the decision maker should consider the same option that was discussed above.

4.3.12.11 Choose the elements to be field tested. This choice could be made on the basis of such

criteria as: which elements are most critical with respect to the solution accomplishing its purpose; which elements have to be implemented first; which elements have the highest risk of failure; which elements are most confusing to the decision maker; which elements would generate the most serious consequences if they failed; or which elements consume the greatest amount of resources? These are possible rather than mandatory criteria. Others could be used. However, any criteria used should be at least approved by and, if possible, developed in cooperation with the decision maker.

4.3.12.12 For each element, determine when the activities for implementing that element can be developed.

4.3.12.13 Choose the first/next element for which implementation activities are to be worked out.

4.3.12.14 Develop the activities necessary to implement that element.

4.3.12.14.1 Develop an initial list of activities.

4.3.12.14.1.1 Imagine and write down all the ways in which you could implement this element, avoiding all problems.

4.3.12.14.1.2 Imagine and write

down in what ways you could fail to implement this element.

4.3.12.14.1.3 Imagine the element being implemented; write down what is happening.

4.3.12.14.1.4 Think up activities that have nothing to do with implementing this element and consider whether they do or not.

4.3.12.14.1.5 Create one list from all the lists generated in the previous steps. For the activities generated in 4.3.12.14.1.2, change their statements so that they describe an activity that could be used in the implementation of the element.

4.3.12.14.2 Test the completeness of the list of activities by performing any combination of the following steps:

4.3.12.14.2.1 Have others perform the previous steps. Examine their responses and decide if

their list of activities contains activities that you would like to add to your original list. If so, do so.

4.3.12.14.2.2 Think up alternatives to your original list of activities and then consider if these alternatives should be added to your original list. Make any additions that you believe are appropriate.

4.3.12.14.2.3 Think up unusual ways of implementing the element and then consider if these items could be one of the activities for implementing the element. If you believe that they can, you should add them to your original list of activities.

4.3.12.15 Examine your list of activities and discard any that you believe are not necessary for the implementation of the element.

4.3.12.16 Arrange the activities in the order in which they would be implemented if the element were

actually being carried out.

4.3.12.17 Have the decision maker review the list of activities to make sure that he/she has a clear idea of what each activity means, that there is a logical flow from one activity to another, and that critical activities are not missing from the list.

4.3.12.18 Confirm the activities with any individuals or groups whom the decision maker may choose on the basis of law, policy or personal preference.

4.3.12.19 Choose the activities to be field tested. This choice could be made on the basis of such criteria as: which activities are most critical with respect to accomplishing the purpose; which activities have to be implemented first; which activities have the highest risk of failure; which activities are most confusing to the decision maker; which activities would generate the most serious consequences if they failed; or which activities consume the greatest amount of resources. These are possible rather than mandatory criteria. Others could be used. However, any criteria used should be at least approved by and, if possible, developed in cooperation with the decision maker.

4.3.12.20 Determine when each activity can be field tested.

4.3.12.21 Choose the first/next activity to be field tested.

4.3.12.22 Develop the criteria against which the activities will be tested. These criteria could be drawn from any one of the following sources: the purpose of the activity; the purpose of the element of which the activity is a part; the purpose of the solution of which the element is a part; the goals that the decision maker has for the field test.

4.3.12.23 Develop an observational technique for measuring the effectiveness of the activity in meeting the chosen criteria.

4.3.12.24 Determine if any additional tests are to be or can be carried out at this time. If so, cycle to step 4.3.12.22 if these additional tests are to involve additional activities of the same element; to step 4.3.12.14 if these additional tests are to involve other elements of the same alternative solution; or to step 4.3.12.5 if these additional tests are to involve different alternatives.

4.3.12.25 Implement the tests that have been planned.

4.3.12.26 Compile the results of the tests that have

been implemented.

4.3.12.27 Review the results compiled.

4.3.12.28 Carry out any additional testing that remains to be done. No testing will remain to be done if the decision maker believes that he/she can choose the most appropriate solution based on the testing already performed. Also, no testing will remain to be done if the resources for implementing this step have run out. It is also possible that the decision maker will be dissatisfied with the results of previous testing and may want to perform additional tests. If additional testing is to be performed, the methodologist should repeat appropriate sections of the above procedures.

4.3.12.29 Choose the most appropriate ideal solution using the results of the testing that has been performed.

4.4 Have the decision maker review the solution to make sure that he/she believes that it is the most effective way of accomplishing the purpose. If the decision maker is not convinced as to the solution's effectiveness, then the solution should be changed. At this point, the decision maker may want to develop an entirely different solution. If a new solution is developed, the decision maker should examine it against his/her purpose using one of the above selection processes.

4.5 Confirm the chosen solution with any individuals or groups that the decision maker may choose on the basis of law, policy or personal preference.

4.6 Evaluate the effectiveness of this major process.

4.7 Determine if the ideal solution is a feasible way of accomplishing the purpose. If the ideal solution is also a feasible solution, proceed to step 6.0 and plan the implementation of the solution. If not, simply proceed to the next step.

4.8 Cycle back to step 1.6.7.

Gaps Identified in Major Process 5.0:
Develop the Actual Solutions

5.0 Develop the actual solution.

5.1 Plan the implementation of this step.

5.2 Arrange the parts of the ideal solution into the order in which they will be worked on.

5.3 For the first (next) part, state the part's purpose.

5.4 Identify the resources that are actually available to implement this part.

5.5 Develop feasible alternatives to the ideal part.

5.5.1 Write down all the things that you would need to accomplish the purpose of the part.

5.5.2 Write down all the things that if you did not have might cause you to fail to accomplish the purpose

of the part.

5.5.3 Write down all the things that you would be actually using if you were accomplishing the part's purpose.

5.5.4 Write down all the unusual things that you might use to accomplish the purpose of the part.

5.5.5 Write down all those things that have nothing to do with your accomplishing the purpose of the part.

5.5.6 Test the above list for completeness.

5.5.7 Review each alternative developed above in light of the resources actually available to make sure that the alternative is feasible.

Four gaps were discovered in the above steps. The first gap involved step 5.2. That step did not provide for the different levels of specificity to which the ideal solution could have been developed in the previous major process. This step assumed that the major elements of the ideal solution had already been developed. This assumption may or may not be true. How fully the ideal solution is developed depends upon the technique used in the previous major process to select the ideal solution from a set of alternative ideal solutions. The new version of step 4.5 provides the decision maker with a number of selection techniques. These techniques include field testing, simulation, modelling, the Delphi procedure, and estimating the probabilities of success for each of the alternative ideal solutions. Field testing, simulation and

modelling require that the ideal solution be developed to at least the level of its major elements. However, when selecting the most appropriate ideal solution through the use of estimation or through the use of the Delphi procedure, the ideal solution need not be developed past the level of a general descriptive statement. If the major elements of the ideal solution were not developed, the methodologist may be unable to implement the above step. In this case, the methodologist and the decision maker would have reached a "dead end." This is a serious problem because it represents a break in the Methodology's continuity, in the logical flow that should exist from procedure to procedure.

The second, third and fourth gaps all involved step 5.5. In order to fill these gaps, step 5.5 was completely redesigned. The second gap involves the fact that this step does not provide for using the information generated in either step 5.4 or 5.3. In step 5.3, the purpose of a particular part of the ideal solution is identified. In step 5.4, the resources that are available to implement that part are identified. These two steps lay the foundation for developing feasible alternatives to the ideal solution. Given the information that is generated in these two steps, a feasible alternative to the ideal solution can be developed by designing alternatives to each part of the ideal solution that can accomplish the part's purpose within the resources that are available for implementing the part.

The third gap involves the fact that step 5.5 contains no procedures for making the feasible alternatives as similar to the ideal solution as possible. The ideal solution is a target. A feasible solution should be as similar to the ideal solution as possible because the ideal

solution represents the solution that is most desirable to the decision maker. If this approach were not followed, then the feasible solution, the solution that is to be implemented, may not be optimal with respect to the decision maker's desires. In this case, the Methodology will most likely fail to accomplish its purpose which is to make decisions, which are optimal with respect to a decision maker's desires. Such a decision may be interpreted as the implementation of a solution that is optimal with respect to the desires of a decision maker. Thus, the solutions generated in this step should not only be feasible, but they should also be as ideal as possible.

The fourth gap involves the sub-steps that have been developed for implementing step 5.5. Each of these sub-steps asks the decision maker to identify things. A decision maker could quite easily equate the word "things" with the concept of hardware. In such a situation, objects rather than alternative parts would be generated. Such a situation would represent a serious problem because an alternative part is much more than the material resources necessary to carry it out, and if all these steps do is identify those resources, then they are critically incomplete. The new version of the above steps appears below.

5.0 Develop the actual solution.

5.1 Plan the implementation of this major process.

5.2 Determine if the elements of the ideal solution have been developed. If they have, then proceed to the next step. If not, then proceed to step 5.6.

5.3 Arrange the parts of the ideal solution in the order in which feasible alternatives will be designed for them.

5.4 Allocate the resources for implementing the rest of this

major process among the parts of the ideal solution.

5.5 Choose the first/next ideal part for which a feasible alternative is to be developed.

5.6 State the purpose of the ideal part or ideal solution.

5.7 Determine the resources that are actually available for implementing the ideal part or the ideal solution.

5.8 Have the decision maker respond to the following stimulus: Imagine a situation in which you only have (the amount of resources identified in step 5.7) available for (accomplishing the purpose identified in step 5.6). How might you change (the ideal solution or part) so that it can be implemented within the available resources? Every effort should be made to change the ideal solution as little as possible.

5.9 Test the completeness of the decision maker's list of feasible alternatives by performing any combination of the following activities:

5.9.1 Have others repeat step 5.8.

5.9.2 Ask the decision maker to imagine a situation in which he/she is at this very moment actually attempting to accomplish the purpose of the ideal solution or part within the resources that are available for implementing that solution or part. Have him/her observe that situation very carefully and write down all that he/she sees happening. Have him/her then consider whether the items that have been identified

might be viewed as feasible alternatives and, if so, add them to the list of feasible alternatives.

5.9.3 Have the decision maker generate alternatives to his/her feasible alternatives.

5.9.4 If feasible alternatives are being generated for the ideal solution as a whole, have the decision maker review the list of usual solutions for accomplishing the purpose of the ideal solution that were developed in step 4.2.3.3 and consider whether these usual solutions might be added to the list of feasible solutions.

5.9.5 If feasible alternatives are being developed for a particular part of the ideal solution, have the decision maker generate usual structures for accomplishing the part's purpose and then modify these structures so that they are as ideal as possible.

5.6 Choose the most appropriate feasible alternative. (Refer to step 4.5).

5.6.1 Develop the criteria on which the selection will be made (4.5.1).

5.6.2 Choose the alternatives to be tested (4.5.2).

5.6.3 Prepare the alternatives chosen for testing by developing the activities of each alternative part (4.5.3).

5.6.4 Choose the activities to be tested (4.5.4).

5.6.5 Plan for testing (4.5.5).

5.6.6 Implement the plan for testing (4.5.6).

5.6.7 Evaluate (4.5.7).

The same problem was identified in the above steps as was identified in step 4.5. In step 4.5, the most appropriate ideal solution was selected from among a set of alternative ideal solutions. In step 5.6, the most appropriate feasible solution is selected from among a set of alternative feasible solutions. In both steps, field testing is the selection technique used. Neither step provides the decision maker with a variety of selection techniques, and in this sense they are both incomplete. Since both steps have a similar purpose, that is to select the most appropriate solution from among a set of alternative solutions, be those alternatives feasible or ideal, and because the same problem was identified in both, the revisions that were made in step 4.5 were also made in step 5.6. Since these revisions are extensive and have already been presented in the discussion of step 4.5, they will not be repeated here. In examining these revisions, the reader should mentally substitute the phrase "feasible solution" for the phrase "ideal solution" whenever the latter phrase appears. This will enable the reader to translate these revisions into the context of the fifth major process of the Methodology, "Design the Actual Solution." As has already been mentioned, these revisions are used as procedures for selecting the most appropriate feasible solution.

Gaps Identified in Major Process 6.0:
Plan the Implementation of the Solution

6.0 Plan the implementation of actual solution.

6.1 Plan the implementation of this step.

6.2 Arrange the parts of the feasible solution into the order in which they will be worked on.

6.3 Choose the first (next) part to be worked on.

The same problem was discovered in the above two steps that was discovered in step 5.2. The problem is that the above steps assume that the major parts of the feasible solution have already been developed. In step 5.2, a similar assumption was made about the parts of the ideal solution. In both steps, the validity of this assumption depends upon the technique used in the previous major process to select the most appropriate solution from among a set of alternative ideal solutions or from among a set of alternative feasible solutions. At least two of the techniques documented in major processes four and five do not provide for developing the solution to the level of its major parts. Thus, the above step does not, as step 5.2 does not, provide for the different levels of specificity to which the solution could have been developed in previous major processes. To fill this gap, new procedures were added to this major process. These new procedures provide a mechanism for dealing with the different levels of specificity to which the feasible solution could have been developed.

6.0 Plan the implementation of the solution.

6.1 Plan the implementation of this major process.

6.2 If the elements of the feasible solution have not been designed, then proceed to the next step. If the elements of the feasible solution have been developed, proceed to step 6.7.

6.3 Design the major elements of the feasible solution.

6.3.1 Imagine and write down all the ways in which you could implement this solution, avoiding all problems.

6.3.2 Imagine and write down in what ways you could fail to implement this solution.

6.3.3 Imagine the solution being implemented; write down what is happening.

6.3.4 Think up elements that have nothing to do with implementing the solution and consider whether they do or not.

6.3.5 Create one list from all the lists generated in the previous steps. For the elements generated in step 6.3.2, change their statements so that they describe an element that could be used in the implementation of the solution.

6.3.6 Test the completeness of your list of elements by performing any one or combination of the following activities:

6.3.6.1 Have others perform the previous steps.

Examine their responses and decide if their list of elements contain elements that you would like to add to your list. If there are such elements, then add them to your list.

6.3.6.2 Think up alternatives to your original list of elements and then consider if these alternatives should be added to your original list. Make any additions that you believe are appropriate.

6.3.6.3 Think up unusual ways of implementing the solution and then think if these could be one of the solution's major elements. If you believe that they can be, then you should add them to your original list of major elements.

6.3.7 Examine your list of major elements and discard any that you believe are not necessary for the implementation of the solution.

6.4 Review the major elements.

6.4.1 Review the entire list of elements.

6.4.1.1 Arrange the elements in the order in which they would be carried out if the elements were being carried out.

6.4.1.2 Is the list of elements complete?

6.4.1.2.1 Simple Method: Review the list

of elements in light of the solution's purpose and determine if there are an adequate number of elements for accomplishing the purpose. Any missing element should be added.

6.4.1.2.2 Complex Method: Review the list of elements in light of the operational components of the purpose and determine if there are an adequate number of elements for accomplishing each component. Any missing element should be added.

6.4.1.3 Are there anchoring elements? If not, add them.

6.4.1.4 Is there logical flow from one element to another? Critical gaps between elements should be filled.

6.4.1.5 Will serious problems arise during the implementation of the elements?

6.4.1.5.1 Simple Method: Ask the decision maker the following question: Do you foresee serious problems arising during the implementation of the elements; and if so, what are they? A serious problem is

one that would significantly hinder the solution from accomplishing its purpose. If serious problems can be predicted, the decision maker should either modify the solution so that there are mechanisms for dealing with the problem should it arise, or the decision maker should take steps to eliminate the cause of the problem.

6.4.1.5.2 Complex Method:

6.4.1.5.2.1 Have the decision maker list the serious problems that may arise during implementation.

6.4.1.5.2.2 Order these problems on the basis of how seriously they would hinder the accomplishment of the purpose of the solution.

6.4.1.5.2.3 Determine the probability of each problem occurring. This can be done in a number of ways; for instance, the decision maker could have

the methodologist gather data on the probability of the problem.

6.4.1.5.2.4 If the above step indicates that a serious problem will arise during implementation, then the decision maker may want to either take steps to eliminate the cause of the problem and thereby hopefully eliminate the problem itself, or take steps to plan for dealing with the problem, should it arise.

6.4.1.6 Will serious negative effects on other people arise during the implementation of the elements? Any negative effects should be eliminated or at least minimized.

6.4.1.7 Can the elements be implemented within the available resources? If not, the elements should be changed so that they can be implemented practically.

6.4.2 If the resources and desire permit, review the elements individually.

6.4.2.1 Prioritize the list of elements.

6.4.2.2 Select the first/next element.

6.4.2.3 State the element's purpose.

6.4.2.4 Test the purpose.

6.4.2.5 Examine the element to determine if it is clearly defined. If not, clarify it.

6.4.2.6 Examine the element to determine if it is stated procedurally. If not, restate it.

6.4.2.7 Is the element necessary?

6.4.2.7.1 Simple Method: Have the decision maker make a judgement as to whether or not it is highly probable that some unforeseen event will cause the purpose of the element to be accomplished. If this could happen, then it might be unnecessary to implement the element.

6.4.2.7.2 Complex Method: Develop a list of unforeseen events that may cause the purpose to be accomplished.

6.4.2.7.3 Order these events on how completely they would accomplish the purpose.

6.4.2.7.4 Determine the probability of each happening.

6.4.2.7.5 If the above step indicates that some unplanned event will accomplish the purpose of the element, then the decision maker may want to consider deleting the element from his/her list.

6.4.2.8 Repeat step 6.4.1.5 for the element.

6.4.2.9 Repeat step 6.4.1.6 for the element.

6.4.2.10 Repeat step 6.4.1.7 for the element.

6.4.2.11 Recycle back to 6.4.2.2 and repeat as many of the above steps for as many of the elements as possible.

6.5 Confirm the elements with those individuals or groups that the decision maker may choose on the basis of law, policy or personal preference.

6.6 Prioritize the elements so as to be able to determine how much resources should be devoted to each for the purpose of designing the activities that will be necessary to implement a particular element.

6.7 Allocate the design resources to the elements according to their priorities.

6.8 Choose the first/next element.

6.9 Perform steps 6.4.2.3 and 6.4.2.4 if they have not already been carried out.

6.10 Design the activities necessary to implement the element.

6.10.1 Imagine and write down all the ways in which you could implement this element, avoiding all problems.

6.10.2 Imagine and write down in what ways you could fail to implement this element.

6.10.3 Imagine the element being implemented; write down what is happening.

6.10.4 Think up activities that have nothing to do with implementing the element and consider whether they do or not.

6.10.5 Create one list from all the lists generated in the previous steps. For the activities generated in step 6.3.2, change their statements so that they describe an activity that could be used in the implementation of the element.

6.10.6 Test the completeness of your list of activities by performing any combination of the following procedures:

6.10.6.1 Have others perform the previous steps. Examine their responses and decide if their list of activities contain activities that you would like to add to your list. If there are such activities, then add them to your list.

6.10.6.2 Think up alternatives to your original list of activities and then consider if these alternatives should be added to your original list. Make any additions that you believe are appropriate.

6.10.6.3 Think up unusual ways of implementing the element and then think if these items could be one of the activities necessary to implement the element. If you believe that they can be, then you should add them to your original list of activities.

6.10.7 Examine your list of activities and discard any that you believe are not necessary for the implementation of the element.

6.5 Review the activities.

6.5.1 Arrange the activities in a chronological order.

6.5.2 Examine each activity separately.

6.5.2.1 Determine the degree to which each activity is operationally defined. If it is fuzzy, define it making sure that the resultant components are stated procedurally. Make any needed changes in the chronological list.

6.5.2.2 Determine if each activity is appropriate (within the person's present knowledge, capability and skill).

6.5.2.3 Review each activity in light of the resources that are needed to carry it out.

6.5.2.4 Identify appropriate consequences which are to follow the successful completion of each activity.

6.5.2.5 Repeat the above steps for each activity.

6.5.3 Examine the whole list of activities to make sure that there is a logical flow from one activity to another.

6.5.4 Examine the first and last activities on the chronological list to determine whether or not they are in fact the first and last (anchoring) activities.

6.5.5 Look at each activity against its part's purpose and determine if any other activities could/should be added in order to maximize the accomplishment of the part's purpose.

6.5.6 Review the internal consistency of the activities for that part.

6.5.6.1 By inspection.

6.5.6.2 By testing.

6.5.7 Review the external consistency of the activities.

6.5.7.1 By inspection.

6.5.7.2 By testing.

6.5.8 Make any needed changes in the list of activities based on the review.

Two gaps were discovered in the above steps. The first involved completeness. The second involved sequencing. The above steps are incorrectly sequenced because individual activities should be reviewed only after the entire list of activities has been examined. The major advantage of reviewing the entire list first is that major weaknesses in the list will most likely be uncovered more efficiently. This is possible

because the review of a list of activities will consume a much smaller amount of resources than the review of each individual activity in the list.

The above steps are incomplete because they do not provide the decision maker with the opportunity to answer three very important questions. The first of these questions is: will the activity have any serious negative effects on other people? In not asking this question, these steps may allow the decision maker to be an unconscious participant in the harming of another human being. This question should be asked because ideally, the solution should have no negative consequences on any person, place or thing. The above steps also leave unanswered the question of whether or not the activities are necessary. The word "necessity" as it is used in this Methodology means: is it highly probable that some random event will accomplish the purpose of a particular activity? If so, it may be unnecessary to implement that activity. Answering this question might help the decision maker identify and delete unnecessary activities. The final question left unanswered is this: what serious problems may arise during the implementation of the activity? This question has an obvious relevance. Problems are very difficult to solve until they have been identified. Once problems have been identified, the decision maker may either develop strategies for dealing with the problem, should it arise, or the decision maker may avoid the problem altogether by identifying and eliminating the cause of the problem.

In asking and answering these questions, steps are taken towards assuring a problem free implementation of the solution's activities. In filling these two gaps, the sequencing of the above steps was changed and

new procedures were added whereby the decision maker could respond to the above three questions.

6.11 Review the activities.

6.11.1 Review the entire list of activities.

6.11.1.1 Arrange the activities in the order in which they would be carried out if the activities were being carried out.

6.11.1.2 Is the list of activities complete?

6.11.1.2.1 Simple Method: Review the list of activities in light of the element's purpose and determine if there are an adequate number of activities for accomplishing the purpose. Any missing activities should be added.

6.11.1.2.2 Complex Method: Review the list of activities in light of the operational components of the purpose and determine if there are an adequate number of activities for accomplishing each component. Any missing activities should be added.

6.11.1.3 Are there anchoring activities? If not, add them.

6.11.1.4 Is there logical flow from one activity to another? Critical gaps between activities

should be filled.

6.11.1.5 Will serious problems arise during the implementation of the activities?

6.11.1.5.1 Simple Method: Ask the decision maker the following question: Do you foresee serious problems arising during the implementation of the activities; and if so, what are they? A serious problem is one that would significantly hinder the element from accomplishing its purpose. If serious problems can be predicted, the decision maker should either modify the solution so that there are mechanisms for dealing with the problem should it arise or the decision maker should take steps to eliminate the cause of the problem.

6.11.1.5.2 Complex Method:

6.11.1.5.2.1 Have the decision maker list the serious problems that may arise during implementation.

6.11.1.5.2.2 Order these problems on the basis of how seriously

they would hinder the accomplishment of the purpose of the element.

6.11.1.5.2.3 Determine the probability of each problem occurring. This can be done in a number of ways--for instance, the decision maker could have the methodologist gather data on the probability of the problem.

6.11.1.5.2.4 If the above step indicates that a serious problem will arise during implementation, then the decision maker may want to either take steps to eliminate the cause of the problem and thereby hopefully eliminate the problem itself, or take steps to plan for dealing with the problem, should it arise.

6.11.1.6 Will serious negative effects on other people arise during the implementation of the activities? Any negative effects should be eliminated or at least minimized.

6.11.1.7 Can the activities be implemented within the available resources? If not, the activities should be changed so that they can be implemented practically.

6.11.2 If the resources and desire permit, review the activities individually.

6.11.2.1 Prioritize the list of activities.

6.11.2.2 Select the first/next activity.

6.11.2.3 State the activity's purpose.

6.11.2.4 Test the purpose.

6.11.2.5 Examine the activity to determine if it is clearly defined. If not, clarify it.

6.11.2.6 Examine the activity to determine if it is stated procedurally. If not, restate it.

6.11.2.7 Is the activity necessary?

6.11.2.7.1 Simple Method: Have the decision maker make a judgement as to whether or not it is highly probable that some unforeseen event will cause the purpose of the activity to be accomplished. If this could happen, then it might be unnecessary to implement the activity.

6.11.2.7.2 Complex Method: Develop a list of unforeseen events that may cause the purpose to be accomplished.

6.11.2.7.3 Order these events on how completely they would accomplish the purpose.

6.11.2.7.4 Determine the probability of each happening.

6.11.2.7.5 If the above step indicates that some unplanned event will accomplish the purpose of the activity, then the decision maker may want to consider deleting the activity from his list.

6.11.2.8 Repeat step 6.11.1.5 for the activity.

6.11.2.9 Repeat step 6.11.1.6 for the activity.

6.11.2.10 Repeat step 6.11.1.7 for the activity.

6.11.2.11 Determine if each activity is appropriate (within the person's present knowledge, capability and skill).

6.11.2.11.1 State who is going to be performing the activity.

6.11.2.11.2 Identify a behavior presently existing in that person's repertoire that is identical or similar to the expected activity.

6.11.2.11.3 Plan for the observation of that activity.

6.11.2.11.4 Plan for the reporting of the

data collected.

6.11.2.11.5 Integrate and implement the above two plans.

6.11.2.11.6 Review the results in order to determine if the expected behavior is appropriate. If the behavior is inappropriate either:

6.11.2.11.6.1 Drop the activity as an expectation.

6.11.2.11.6.2 Identify another person who is capable of performing the activity.

6.11.2.11.6.3 Change the activity so that it is in line with the individual's present knowledge, capability and skill.

6.11.2.11.6.4 Identify a prerequisite activity which, when established, will remedy the deficiency.

6.11.2.11.7 Make any necessary changes in the chronological list.

6.11.2.12 Review each activity in light of the resources that are needed to carry it out.

6.11.2.12.1 Select the method of identification.

6.11.2.12.1.1 Directly observe the person performing the activity.

6.11.2.12.1.2 Ask yourself.

6.11.2.12.1.3 Ask others.

6.11.2.12.1.4 Ask the person who is involved in the activity.

6.11.2.12.1.5 Directly observe others performing the activity.

6.11.2.12.1.6 Directly observe the products of others who have performed the activity.

6.11.2.12.1.7 Read literature.

6.11.2.12.1.8 Some combination of the above.

6.11.2.12.1.9 Any other appropriate method of identification.

6.11.2.12.2 Using the selected method of identification, answer the following questions.

6.11.2.12.2.1 What would the who require to carry out the activity?

6.11.2.12.2.2 If the who had failed to carry out the activity, what would they be missing?

6.11.2.12.2.3 If the who were actually carrying out the activity, what would they be using?

6.11.2.12.2.4 What unusual things could be used by the who to carry out the activity?

6.11.2.12.2.5 What things have nothing to do with the who carrying out the activity?

6.11.2.12.2.6 Combine the above lists into one list.

6.11.2.12.3 Test the above list for completeness.

6.11.2.12.3.1 The methodologist and/or decision maker develops and implements appropriate tests of completeness.

6.11.2.12.3.2 Use another mode of identification.

6.11.2.12.3.3 Answer the above questions for similar activities.

6.11.2.12.3.4 Answer the above questions for completely unrelated activities.

6.11.2.12.4 Choose the most appropriate and the most critical prerequisite resources.

6.11.2.12.5 Review the chosen list of resources to determine if they will be available at the time the activity is called for. If there is any doubt that these critical prerequisite resources will be available, add to the chronological list of activities other activities which are designed to acquire the needed resources.

6.11.2.13 Identify appropriate consequences which are to follow the successful completion of each activity.

6.11.2.13.1 Determine whether or not consequences are needed by answering the following questions:

6.11.2.13.1.1 Is the activity already highly desirable to the person involved?

6.11.2.13.1.2 Is the person already performing the activity frequently?

6.11.2.13.1.3 If your answer to

either of the above questions is yes, then consequences are not needed. If your answer is no, then proceed through the rest of this step until an appropriate consequence is identified.

6.11.2.13.2 Choose the most appropriate type of consequence.

6.11.2.13.2.1 Success and simple movement to the next activity.

6.11.2.13.2.2 Social interactions (talking to others, praise, constructive criticism from supervisor or peers, being touched or hugged, etc.).

6.11.2.13.2.3 Activities (talking or teaching courses, independent study programs, playing tennis, etc.).

6.11.2.13.2.4 Tokens (money, points, chips, etc.).

6.11.2.13.2.5 Others not listed.

6.11.2.13.3 If success is chosen, then the activity should be recycled through 6.11.2.5, 6.11.2.11 and 6.11.2.12

until the chance of failure has been eliminated.

6.11.2.13.4 If any other type of consequence has been chosen, then the following steps should be performed.

6.11.2.13.4.1 Select the method of identifying alternative consequences within the chosen consequence category (6.11.2.12.1).

6.11.2.13.4.2 Develop an exhaustive list of alternative consequences within the chosen consequence category.

6.11.2.13.4.3 Choose the most appropriate consequence using the following criteria: Effectiveness in maintaining the activity (desirability to the person involved); Cost; Consequences on the environment (disruption or unsettling effects on yourself and others); Any other appropriate criteria.

6.11.2.13.5 Determine if there are activities to acquire/develop and administer

the chosen consequence. If there are none, develop them and add them to the chronological list of activities.

6.12 Recycle to 6.8 and repeat the last five steps until all elements have activities designed for their implementation.

6.13 Integrate the activities for implementing each element into a single chronological list of activities for implementing the solution as a whole.

6.14 Review this single list of activities to make sure that the list is complete; that the list contains anchoring activities; and that there is logical flow from one activity to another. Any new activities developed in this step or in the previous step should also be reviewed.

6.15 Confirm this list of activities with any individuals or groups that the decision maker may choose on the basis of law, policy or personal preference.

6.8 Plan for decision making.

6.8.1 Identify the decision makers.

6.8.2 Identify the decisions that are to be made by the decision makers.

6.8.3 Determine when the decisions are going to be made.

6.8.4 Identify/develop the activities which, when observed, will provide the data needed to make the necessary decisions.

6.8.5 Develop plans for observing the activities.

6.8.6 Develop plans for reporting the data gathered through observation.

6.8.7 Design the process to be used in decision making.

6.8.8 Review the decision making process.

6.8.9 Integrate the plans for observation, plans for reporting, and the decision making process into a single cohesive plan for decision making.

6.8.10 Test the plan for decision making by constructing data which indicate satisfactory, unsatisfactory and grossly deficient performance of an activity and then apply the decision making process to make decisions, given the data.

6.8.11 Integrate the tested plan for decision making into the list of activities (6.6) for accomplishing the purpose.

The above steps assume that the decision maker's role during the implementation of the solution should be to either execute or supervise the execution of the activities of the solution. The author has not found any reason to seriously question that assumption. However, the author has found a serious gap in the above steps. The purpose of these steps is to develop a strategy by which the methodologist can aid the decision maker during the implementation of the solution. The author believes that this strategy should take the form of a feedback mechanism.

The feedback mechanism would be implemented as the solution is being implemented. The feedback mechanism would be used by the methodologist to provide the decision maker with data on the effectiveness of specific solution activities. The decision maker would then use the feedback data to make any necessary corrections in the solution. Thus, the feedback mechanism would aid the decision maker in managing the solution as it is being carried out.

The gap identified is essentially one of clarity. The above steps do not clearly describe the procedures that the methodologist needs to implement in order to develop a feedback mechanism. To fill this gap, the above steps were completely redesigned. The author believes that the new set of steps more clearly describes the procedures that the methodologist should implement in order to develop a feedback mechanism. These new procedures are as follows:

6.16 Provide for feedback.

6.16.1 Select the activities on which feedback data is to be provided. These activities will represent the points at which the solution will be reviewed.

6.16.1.1 Simple Method: Have the decision maker select those activities that he/she believes are most important with respect to the solution accomplishing its purpose.

6.16.1.2 Complex Method: Have the decision maker select those activities that he/she believes are most important with respect to the accomplishment of the most critical components

of the solution's purpose.

6.16.2 Have others perform either the simple or the complex version of the above step.

6.16.3 Make any changes in your list of activities that you believe are necessary, given the results of the previous step.

6.16.4 Prioritize the selected activities. The activities may be prioritized on the basis of such criteria as:

6.16.4.1 Importance in accomplishing the solution's purpose.

6.16.4.2 Importance in accomplishing the most critical components of the solution's purpose.

6.16.4.3 Amount of resources used by the activity.

6.16.4.4 Sequencing.

6.16.4.5 Difficulty.

6.16.4.6 Possibility of failure.

6.16.4.7 Consequence of failure.

6.16.5 Have others repeat the previous step.

6.16.6 Make any changes in your original prioritization that you believe are necessary, given the results of the previous step.

6.16.7 Allocate the resources available for providing feedback among the activities, according to their priorities.

6.16.8 Choose the earliest activity for which a feedback mechanism has not been developed.

6.16.9 Divide the resources available for providing feedback on that activity among the following tasks: designing the feedback mechanism; implementing the feedback mechanism; and reviewing the results of feedback.

6.16.10 Determine the actual date on which the decision maker would like to be provided feedback data on the chosen activity. The earliest date would be immediately after the activity is implemented. The actual date should be as close as possible to the earliest date.

6.16.11 Have the decision maker review all solution activities that are to be implemented prior to this date to determine if he/she would like to receive feedback data on any activities other than the chosen one. Ideally, the decision maker should be provided with feedback data on each of the solution's activities. If additional activities are to be observed, the decision maker should recycle to step 6.16.1 and repeat as many of the last ten steps as possible. The decision maker should then proceed to step 6.16.12.

6.16.12 Use the following procedures to develop a feedback mechanism for the chosen activity.

6.16.12.1 State the purpose of the activity.

6.16.12.2 Clarify the purpose if it is not already stated clearly.

6.16.12.3 Develop an observational technique for

measuring the degree to which the activity accomplishes its purpose.

6.16.12.4 Plan the implementation of the observational technique.

6.16.12.5 Confirm the observational technique and the plan for its implementation with the decision maker.

6.16.13 Recycle to step 6.16.8 until a feedback mechanism has been developed for each activity that the decision maker wants observed prior to the first review point. During the meeting held at the review point, the decision maker should plan on performing the following activities; review the activities that have already been implemented; make any necessary corrections in the solution; review the activities to be implemented prior to the next review point; plan or review the feedback activities to be implemented by the methodologist prior to the next review point.

6.16.14 If resources and desire permit, recycle to step 6.16.8 and repeat the previous steps for as many of the remaining review points as possible.

6.16.15 Integrate all feedback procedures into a single list of activities. This list will serve as a description of the methodologist's role during the implementation of the solution or a particular piece of the solution.

6.16.16 The methodologist should review this list against

such criteria as clarity, completeness, practicality, and coherence.

6.16.17 Confirm this list with the decision maker.

6.16.18 Discuss with the decision maker the options for using feedback data.

6.17 Test the feedback mechanism and/or the solution itself. Make any changes in the solution or in the feedback mechanism that you believe are necessary, given the results of testing.

6.18 Allocate the resources for implementing the solution to the solution's activities.

6.19 Evaluate the effectiveness of this major process.

6.20 Cycle to step 1.6.7.

Gaps Identified in Major Process 7.0:
Implement the Solution

7.0 Implement the solution.

7.1 Plan the implementation of this step.

7.2 Carry out the activities in the order specified and within the resources allocated to each activity. Use the plan for decision making to make any decisions necessary with respect to the implementation of the solution.

7.3 Evaluate.

Major revisions were made in the above steps because, given the new version of major process six--"Plan the Implementation of the Solution," the decision maker and the methodologist have different responsibilities with respect to the implementation of the solution. The changes made were of two general types. The first type provided the decision maker and the methodologist with the necessary procedures for carrying out their respective responsibilities. The methodologist was provided with the necessary procedures for carrying out the feedback mechanism. The decision maker was provided with the procedures that he/she would need to implement or supervise the implementation of the solution. The second type of change provided the decision maker with the procedures for revising the solution as it was being implemented. Solution revisions are assumed to be needed if the data supplied by either the feedback mechanism or by the decision maker's own observations of the solution indicate that the activities of the solution are not working as planned. The changes made are as follows:

7.0 Implement the solution.

7.1 Plan the implementation of this major process.

7.2 The methodologist should proceed to step 7.3 while the decision maker should proceed to step 7.4.

7.3 The methodologist implements the feedback mechanism.

7.3.1 Identify the first/next point at which you are to supply the decision maker with feedback data.

7.3.2 Review all feedback activities that you are to carry out in order to provide the necessary data.

7.3.3 Confirm with the decision maker the exact date at

which you are to provide him/her with feedback data.

7.3.4 Confirm the feedback activities with the decision maker.

7.3.5 Implement the feedback activities.

7.3.6 Compile the feedback data.

7.3.7 Plan for reporting the feedback data to the decision maker. The feedback report should include such items as the activities on which feedback data was gathered, the data gathered on each activity, and the resources used by each activity. Provisions should be made for examining each of the activities with the decision maker. This will entail developing a preliminary allocation of the time that the decision maker has for reviewing the activities among the activities themselves. This allocation may be changed by the decision maker at the beginning of the meeting or as the meeting progresses.

7.3.8 Cycle to 7.5.1.

7.4 The decision maker implements the solution.

7.4.1 Identify the first/next point at which you are to meet with the methodologist for the purpose of reviewing that part of the solution that has been implemented to date.

7.4.2 Identify the first/next activity that you are to implement prior to your meeting with the methodologist.

7.4.3 Review this activity.

7.4.4 Implement or supervise the implementation of this activity.

7.4.5 Gather any data available on the activity's effectiveness, problems encountered and resources used. Personal intuitions regarding the effectiveness of the activity are important data sources and should not be overlooked.

7.4.6 Recycle to 7.4.2 and repeat the last four steps until all the activities that can be carried out prior to your meeting with the methodologist have been carried out.

7.4.7 Cycle to step 7.5.1.

7.5 The methodologist and the decision maker review that portion of the solution that has already been implemented and make any changes that the decision maker believes are necessary.

7.5.1 The methodologist and the decision maker meet at the prearranged time.

7.5.2 The methodologist explains to the decision maker the scope of the meeting. This explanation should include a brief description of the activities to be reviewed and the amount of time that can be devoted to reviewing them as a whole. The decision maker will then determine how much time should be devoted to each activity. This determination is flexible

and may change as the meeting proceeds. In most cases, some time should be allocated to the review of each activity.

7.5.3 The methodologist chooses the first activity to be reviewed according to the activities' sequence of implementation.

7.5.4 Identify the criteria by which the activity will be judged successful.

7.5.5 Identify the resources that had been originally allocated to the activity.

7.5.6 The methodologist presents the decision maker with any data that have been gathered on that activity.

7.5.7 The decision maker identifies any observations that he/she may have made or which others may have communicated to the decision maker regarding the effectiveness of the activity.

7.5.8 Using all the data that have been gathered, the decision maker should answer the following questions:

7.5.8.1 Was the activity successfully implemented?

7.5.8.2 Is the activity critical to the solution accomplishing its purpose?

7.5.8.3 How much resources has the activity actually used?

7.5.8.4 How do the resources used compare to the resources originally allocated? Has the activity used more or less resources than

was originally planned? If so, identify how much. If the decision maker believes that the difference in resources is so slight as to be insignificant, it need not be recorded.

7.5.9 If the activity was both critical and unsuccessfully implemented perform one of the following activities and then implement the rest of step 7.5. For all other activities, proceed to 7.5.13.

7.5.9.1 Plan to reimplement the activity.

7.5.9.2 Design a new activity to be implemented in place of the unsuccessful activity.

7.5.10 Determine the amount of resources required by the option that you chose in step 7.5.9.

7.5.11 If the original activity had used more resources than had been allocated to it, add that amount of resources to the amount of resources that you identified in step 7.5.10.

7.5.12 If the original activity used less resources than had been allocated to it, subtract the excess from the amount of resources that you identified in step 7.5.10.

7.5.13 Make any needed resource adjustments.

7.5.13.1 If the resources consumed by the original activity are greater than the resources initially allocated to it, or if additional

resources are needed to correct a critical activity that was unsuccessfully implemented perform any one or combination of the following activities:

7.5.13.1.1 Adjust the resources that are allocated to the remaining activities so as to "free up" the needed resources.

7.5.13.1.2 Acquire additional resources.

7.5.13.1.3 Delete some of the planned activities so as to "free up" the needed resources.

7.5.13.2 If the resources consumed by the original activity are less than the resources originally allocated to it, perform any one or combination of the following activities:

7.5.13.2.1 Reallocate the saved resources among the remaining activities.

7.5.13.2.2 Develop additional activities that could use the saved resources.

7.5.13.2.3 Allocate the saved resources to some other problem area.

7.5.14 Recycle back to 7.5 until either the resources for this step have run out or until that section of the solution that should be reviewed at this point has

been reviewed and any needed changes have been made.

7.6 The decision maker and the methodologist review that portion of the solution that is to be implemented prior to the next review point. If feedback activities have already been planned, then the methodologist should implement all eleven sub-steps of this step. However, if feedback activities have not been planned, the methodologist should cycle to step 6.16 and plan the necessary feedback activities and then implement the first seven sub-steps of this step.

7.6.1 Identify the activities that are to be implemented prior to the next review point.

7.6.2 Prioritize these activities with respect to their importance in the solution's accomplishing of its purpose.

7.6.3 If necessary and desirable, allocate the resources that are available for reviewing these activities among the activities themselves, according to their priorities.

7.6.4 Choose the highest priority activity.

7.6.5 Review the chosen activity.

7.6.6 Make any changes in that activity that the decision maker believes are necessary.

7.6.7 Recycle back to step 7.5.4 and repeat the previous steps for as many of the activities as possible.

7.6.8 The methodologist presents the decision maker with any feedback activities that the methodologist is to implement prior to the next review point.

7.6.9 The decision maker reviews these feedback activities.

7.6.10 The methodologist makes any changes in the planned feedback activities that he and the decision maker agree to be necessary.

7.6.11 If necessary, the methodologist should review with the decision maker the options for using the feedback data.

7.7 The methodologist recycles to 7.3 and the decision maker recycles to 7.4. Both carry out their respective responsibilities until the solution has been fully implemented, the problem solved, or the resources for implementing the solution have run out.

7.8 Evaluate the effectiveness of this major process.

7.9 Recycle to step 1.6.7.

Gaps Identified in Major Process 8.0:
Evaluate the Solution

8.0 Evaluate.

8.1 Plan the implementation of this step.

8.2 Return to step 4.5.1 where the criteria for an acceptable solution were generated and make a list of these criteria.

8.3 Compile all data provided at the decision making points.

8.4 Review each component in light of the data provided to determine the extent to which each component has been met.

Two gaps were discovered in the above steps. The first involved the data to be used in deciding whether or not a particular component of the decision maker's purpose had been accomplished. In the above steps, only one source of data was included. The data to be used were those which had been gathered by the methodologist and provided to the decision maker at the decision making points. In the new version of step 7.0, "Implement the Solution," these decision making points have been renamed review points. Feedback data is the data provided the decision maker at the decision making points. These data refer to the effectiveness of specific solution activities. These data do not necessarily refer to whether or not the decision maker's purpose has been accomplished. If these data do not refer to whether or not the decision maker's purpose has been accomplished, they can not be used to evaluate the effectiveness of the solution. In this case, the decision maker will have to have other data sources. To fill this gap, additional data gathering procedures were added.

The second gap involves the amount of resources used in gathering data on the various components of the decision maker's purpose. The above steps do not provide for determining how much resources are to be spent on evaluating the accomplishment of each component. It seems logical to assume that a decision maker may want to spend more resources on evaluating the most important components of the purpose than on evaluating

the least important. To fill this gap, new procedures were added whereby the decision maker prioritizes the components of his/her purpose and then allocates the evaluation resources among the components, according to their priorities. The procedures used to fill both these gaps are as follows:

8.2 Make a list of the components of the decision maker's purpose.

8.3 Have the decision maker prioritize the components of the purpose.

8.4 Allocate the evaluation resources among the components according to their priorities.

8.5 Have the decision maker confirm the allocation and make any adjustments that he/she believes are necessary.

8.6 Choose the highest priority component that has not yet been examined.

8.7 Determine if the chosen component has been accomplished.

8.7.1 Compile the results of implementing those solution activities that are related to the accomplishment of that component.

8.7.2 Ask the decision maker to decide if these data indicate to him/her whether or not the component has been accomplished. If the decision maker cannot make this determination, then the decision maker should proceed to step 8.7.3. However, if the decision maker can make this determination, then he/she should record whether or not the component has been accomplished and then proceed to step 8.8.

8.7.3 Design and implement an observational technique for measuring the accomplishment of the component.

8.7.4 Repeat step 8.7.2 using these new data.

8.8 Repeat the previous steps until each component of the decision maker's purpose has been examined or until the resources for implementing these steps have been consumed.

8.5 Determine how many of the components have been satisfactorily met (completeness).

8.6 Determine if the highest priority components have been satisfactorily met (focus).

8.7 Determine the number of the planned activities that were actually implemented (efficiency).

8.8 If the degree of efficiency, focus or completeness is unsatisfactory, determine the cause.

8.9 Present the results of 8.5 through 8.8 to the temporary decision maker to determine if a reapplication of the methodology is desired or called for.

The last two of the above procedures are incorrectly sequenced. In step 8.9, the decision maker reviews the number and priority of the components of the purpose that have been accomplished. If the decision maker is dissatisfied, he/she may choose to have the Methodology reapplied. The first step in reapplication is to determine what portions of the Methodology need to be reapplied. The above sequence has that

determination being made prior to the decision maker's determining whether or not reapplication is necessary. To correct this problem, the sequencing of the above procedures was reversed. The new sequencing is as follows:

8.8 Present the results of 8.5 through 8.7 to the temporary decision maker to determine if a reapplication of the methodology is desired or called for.

8.9 If the degree of efficiency, focus or completeness is unsatisfactory, determine the cause.

8.9.1 The solution was poorly implemented.

8.9.2 The solution (activities and/or plan for decision making) was poorly developed.

8.9.3 The major parts of the actual solution were poorly designed.

8.9.4 The ideal solution was incorrectly conceptualized.

8.9.5 The purpose was poorly stated.

8.9.6 The needs analysis was inadequate.

8.9.7 The preparation for the utilization of the methodology was inadequate in:

8.9.7.1 Planning the application of the methodology.

8.9.7.2 Negotiating the contract.

8.9.7.3 Preparing the methodologist.

8.9.7.4 Disseminating the methodology.

8.9.7.5 Developing a current version of the methodology.

8.9.7.6 Identifying the reader's frame of reference.

8.10 If warranted, reapply the methodology making the changes

indicated in 8.9.

8.11 Evaluate.

8.12 Recycle to 1.6.7.

This concludes the presentation of the results of the logical analysis of Version III of Decision Making Methodology. The results of field testing the Methodology are presented in Chapter Five. The procedures of the Methodology used during the field test were of two types. The first type included existing procedures in which the author had found no serious logical flaws. The second type included new procedures that the author had developed to replace Version III procedures in which a critical gap had been uncovered. Such new procedures have already been discussed in this chapter. Some revisions were also made in the Methodology during the course of the field test. All revisions made during the course of this study have been used to develop a new version of the Methodology. This new version is Version IV. Appendix Six presents this new version of the Methodology. Chapter Six, the final chapter of this document, contains conclusions and recommendations for further research.

CHAPTER V

THE RESULTS OF THE FIELD TEST

Overview of the Chapter

This chapter presents the results of the first field test of Version III, as modified in Chapter Four of Decision Making Methodology. The Methodology's practicality was examined during the course of this field test. The word "practicality" is used here to mean the extent to which the procedures of the Methodology accomplish their respective purposes when they are actually applied. If a particular Methodological procedure did not accomplish its purpose, then it was assumed that a problem exists in the procedure itself. The purpose of the field test was to identify problems. Some redesign was undertaken as the field test was being carried out. This redesign involved the development of new methodological procedures. New procedures were designed to replace existing procedures that were not working well and which the author believed to be critical to the effectiveness of the Methodology.

It should be stressed that the purpose of the field test was to identify problems. The purpose of the field test was not to prove that the Methodology is problem free. A problem free Decision Making Methodology can be produced by drafting successive versions of the Methodology, each of which contains fewer problems than the previous versions. This field test has uncovered problems in the existing procedures. New procedures have been designed to solve the most critical problems. These

new procedures have been used to draft a new version of the Methodology. In so doing, it is hoped that a more effective and more complete version of the Methodology will have been produced. Thus, this study represents an important step in the development of a problem free Decision Making Methodology.

The results of the field test will be presented using the following format: first, the procedure that was tested will be stated and blocked out. Second, the results of testing will be presented. And finally, any actual or suggested revisions in the tested procedure will be detailed.

Decision Making Methodology is a very complex set of procedures. A tremendous amount of resources would be needed to apply each and every procedure of the long form. The purpose of the field test was to implement as many of the Methodology's procedures as was possible, given the resources that a particular decision maker had available for the purpose of applying the Methodology. The only procedures reported in this chapter are those that were actually carried out. Procedures not reported on are procedures that were not implemented due to resource limitations.

Results of Implementing Major Step 1.5: Negotiate the Decision Making Contract

1.5.3.1 Identify all those who have needs that the Methodology might meet.

The author was interested in applying the Methodology for teacher educators because teacher education was an area of particular interest

to the author. In implementing the above step, the author first discussed the Methodology with two faculty members at the University of Massachusetts' School of Education, whom the author believed would have knowledge of the type of decision maker for whom the author would be interested in applying the Methodology. These faculty members were Dr. Richard Clark and Dr. Horace Reed. Dr. Clark was chosen because for a number of years, he has held the position of assistant dean for teacher education at the University of Massachusetts' School of Education. The author believed that in that capacity, Dr. Clark would be well informed as to the decision making needs of the teacher educators at the School of Education. Dr. Reed was chosen because for a number of years, he had been actively involved in teacher education efforts at the University of Massachusetts.

After discussing the Methodology with Drs. Clark and Reed, the author asked them to identify those teacher educators that may have decision making needs that might be met through an application of the Methodology. Dr. Clark identified the following potential clients:

1. Dr. George Urch
2. Dr. David Day
3. Dr. David Flight
4. Dr. A. Donn Kesselheim
5. Dr. Jack Hruska
6. Mr. Robert Jackson
7. Dr. Judith Speidel

Dr. Reed identified a similar list of potential clients. The only difference between the lists of Dr. Clark and Dr. Reed was that

Dr. Reed's list included the name of Mr. Harold Washburn. At the time of this study, Mr. Washburn was a doctoral student at the University of Massachusetts' School of Education. Mr. Washburn was also director of the "Explorations" teacher education program. The author added Mr. Washburn's name to Dr. Clark's list. This expanded list represented those for whom the Methodology might be applied.

1.5.5 Develop a list of criteria on which to choose the most appropriate client(s).

1.5.5.1 Operationally define the concept "A completely successful application of Decision Making Methodology."

In developing a list of criteria against which to choose the most appropriate clients, the author imagined a situation in which Decision Making Methodology had been applied with complete success. The author then observed this situation in his mind, paying particular attention to the type of decision maker with whom the author would be working. The decision makers envisioned by the author had the following characteristics:

1. Experience in and a positive attitude toward logical problem solving in the social sciences.
2. Interest in Decision Making Methodology.
3. A reasonably large amount of time (as close as possible to one hundred hours) that they could devote to an application of the Methodology.

These characteristics were then used by the author as criteria against which to choose the most appropriate client.

1.5.7 Choose the most appropriate client(s).

In choosing the most appropriate client, the author examined each potential client identified in step 1.5.3.1 against each of the criteria that was developed in step 1.5.5.1. The method of examination used was to ask each client orally or by phone what was their experience in and attitude toward logical problem solving in the social sciences, how interested they were in contracting for an application of Decision Making Methodology, and if interested, how many hours of their own time would they be able to devote to an application. Mr. Jackson was the client that most completely satisfied the selection criteria. He had more background and training in logical problem solving than did any of the other potential clients. He had experience and training in the areas of behavioral psychology and systems analysis, each of which stressed logical problem solving. Mr. Jackson was very interested in the Methodology because its purpose "to make decisions that are optimal with respect to a person's desires" provided that the specifics of any decision made would come from Mr. Jackson and not from any outside agent such as the author. Mr. Jackson was also capable of devoting forty eight hours of his own time to an application of the Methodology. He also believed that he could provide reasonable amounts of available resources such as secretarial support and the time of other members of the Special Education Department.

1.5.8 Gather the information necessary to develop a contract statement.

1.5.8.1 The name of the contract decision maker.

A contract decision maker is the individual or group who has control of the resources to be used in a given application of the Methodology. Most of the resources to be used in this application were to be drawn from the Special Education Department. The only resources not to be drawn from the Special Education Department were those that would be supplied by the author himself. Mr. Jackson believed that he should be designated as the contract decision maker because he was the head of the Special Education Department and in that capacity managed that department's usage of the resources allocated to it, therefore, throughout the application, Mr. Jackson served in the capacity of contract decision maker.

1.5.8.2 The problem area in which the contract decision maker wants to make decisions.

In implementing this step, the author asked Mr. Jackson to identify the area in which he would like to make decisions through the use of the Methodology. Mr. Jackson identified a number of problem areas. These areas were:

1. Criteria for selecting undergraduates.

2. Revamping the present two year undergraduate program in Special Education.
3. How to best select and utilize incoming doctoral students so as to give viability to the Special Education Program.
4. How to better delegate responsibility to teaching assistants.
5. Explore whether it is timely and beneficial to link the Special Education Program to other established programs such as Urban Education.
6. Selection of new faculty members; whether they should be male or female, black or white, assistant or associate professor.
7. Supervisors and training sites for interns.
8. Selection of inservice districts.
9. Seeking funding.
10. Better overall organization and scheduling.

From this list of ten problem areas, the author asked Mr. Jackson to select that area that he believed to be most important. Mr. Jackson selected the problem area of revamping the present two year undergraduate program. Given these results, the author believed that the above step might be more effective if instead of first having a decision maker identify a single problem area, it had the decision maker identify a variety of problem areas and then select the most important. These revisions are suggested because they were the activities that the author carried out in order to implement the above step. These suggested revisions were not made because the author did not believe that they were critical to the effectiveness of the Methodology.

1.5.8.3 The specific dates of the contracting period.

The contracting period is that block of time during which the Methodology is to be applied. At this time, which was mid June, 1974, Mr. Jackson believed that the application should begin during the summer of 1974 and conclude at some point in the early fall of that same year. Mr. Jackson indicated that for his purposes, he did not need to have the contracting period delineated any more precisely than it already was. A flexible delineation of the contracting period was also acceptable to the author because his schedule during the period of time in which the Methodology was to be field tested was also flexible.

1.5.8.4 The names of any other decision makers for whom the contract decision maker would like to see the Methodology applied and who make decisions with respect to the problem area.

As was mentioned in Chapter Three, The Design of The Study, this field test of Decision Making Methodology was to be carried out in an uncomplicated situation. Since an application involving many decision makers is more complicated than an application involving a single decision maker, the author had decided to work with only one decision maker during the course of the field test. Mr. Jackson believed that he should be that decision maker because given his training, experience, and present position, he perceived himself as the person best qualified to make

decisions about revamping the present two year undergraduate program in Special Education.

1.5.8.5 The resources that will be available for this application of the Methodology.

Time was the primary resource that both the author and Mr. Jackson could devote to this application of the Methodology. The author had decided before the field test had begun that it would be both desirable and necessary for him to devote at least twice as many hours of his own time to the application of the Methodology as the decision maker was capable of devoting. Mr. Jackson believed that he could devote forty eight hours of his own time to the application of the Methodology. Therefore, the author would devote at least ninety six hours of his own time. Other resources such as secretarial support, travel expenses, and the time of members of the Special Education Department, other than Mr. Jackson's, would most likely be consumed during the application. The amounts of these other resources were not identified at this time because Mr. Jackson believed that when needed, he could provide a reasonable amount of these resources but that it was too early in the application to determine the exact amounts required.

1.5.8.6 The amount of resources to be devoted to each decision maker.

1.5.8.6.1 Prioritize the decision makers.

1.5.8.6.2 Allocate the resources for this application of the Methodology among the decision makers according to their priority.

1.5.8.6.3 Allocate the resources for each decision maker among the major processes of the Methodology.

Since Mr. Jackson was the only decision maker with whom the author was to work during this application of the Methodology, all the available resources were devoted to him. The amount of resources allocated to each major process is as follows:

Figure 2

Percentage of Decision Maker Resources Allocated to the Field Testing of Each of the Eight Major Process of the Long Form of Decision Making Methodology

Major Process	% of decision maker resources (these percentages are based on percentages developed by Hodson [1974])	amount of decision maker resources (hours)
1. Prepare for the utilization of the Methodology.	10	4.80
2. Perform a needs analysis.		
3. Develop a purpose.	2	.96
4. Conceptualize the ideal solution.	10	4.80
5. Design the actual solution.	10	4.80

6. Plan the implementation of the solution.	18	8.64
7. Implement	40	19.20
8. Evaluate	10	4.80

1.5.8.7 Review the resource allocation.

1.5.8.7.1 Ask the contract decision maker to examine the allocation and make any adjustments that he/she believes are necessary.

Mr. Jackson did not believe that any adjustments needed to be made in the resource allocation.

1.5.8.7.2 Explain to the contract decision maker the contingencies under which the terms of the contract can be altered.

Some of the contingencies under which the terms of the contract can be altered include a change in the amount of available resources, a change in the importance of the problem area, or a strong negative reaction to the Methodology on the part of such people as the colleagues, clients, or superiors of the contract decision maker. The author explained and obtained Mr. Jackson's understanding of each of these contingencies. Other contingencies could cause the terms of the contract to be altered.

When this step is more fully developed, a more complete list of contingencies will be provided.

1.5.8.7.3 Ask each decision maker to confirm his/her willingness to work with the methodologist. Also have each decision maker confirm his/her ability to supply the resources that the contract decision maker has said that they could supply. Any problem regarding the commitment or resources of any decision maker should be communicated to the contract decision maker.

Mr. Jackson was the only decision maker for whom the Methodology was to be applied and his commitment to the Methodology had already been established. Also at this time, Mr. Jackson did not foresee any problem in his ability to supply the amount of resources that had been identified previously.

1.5.8.7.4 Determine when each decision maker, including the contract decision maker; will be available during the contracting period.

Mr. Jackson stated that he would be available every Monday and Friday during the contracting period for approximately one and a half hours each day.

1.5.9 Develop a formal or informal contract statement using the above information.

Formal contract statements are written documents. An informal, in the sense of oral rather than written, contract statement was developed between the author and Mr. Jackson. The "terms" of this contract included the amounts of resources to be provided by both the author and Mr. Jackson, the duration of the contracting period, and the Methodology to be used. Since this information has already been presented, it will not be restated here.

1.5.10 Confirm the contract statement with appropriate individuals chosen on the basis of either the preference of the contract decision maker or on the laws or policies that govern the actions of the contract decision maker.

This step was not implemented because Mr. Jackson did not believe that the terms of the contract needed to be confirmed by any individuals other than himself. Mr. Jackson based this belief on the fact that his responsibilities in the Special Education Department provided that he and his staff would be the primary determiners of the specifics of the undergraduate special education program.

1.5.11 The contract decision maker approves the contract statement.

In implementing this step, the author reiterated to Mr. Jackson the "terms" of the informal contract statement that had been developed in step 1.5.8 Mr. Jackson had no objections to the terms of the contract statement or to the fact that it existed as an informal oral agreement as opposed to a formal written document.

1.5.12 Evaluate the effectiveness of this major step.

This step was not implemented through a formally documented set of procedures. In evaluating the effectiveness of step 1.5, "Negotiate the Decision Making Contract," the author simply asked himself whether or not the step had accomplished its purpose which was to develop a written or oral agreement between a methodologist and a contract decision maker describing the broad parameters of the work to be performed. The author interpreted the existence of an informal contract statement between himself and Mr. Jackson as indicative of the fact that this step had accomplished its purpose.

1.5.13 Choose the highest priority decision maker who is available to implement the next major step.

Mr. Jackson was the only and therefore the highest priority decision maker for whom the Methodology was being applied during this application.

Results of Implementing Major Step 1.6
"Plan the Implementation of the Methodology"

1.6 Plan this application of the Methodology.

1.6.1 Plan the implementation of this step.

According to the resource allocation developed in step 1.5.8.6, Mr. Jackson had approximately five hours available for the implementation of this step. The author had approximately ten hours available for the same purpose. In planning the implementation of this step, these resources were allocated among this step's sub-steps. The allocation was developed on the basis of the author's experience with the Methodology rather than on the basis of standardized rules because such rules had not been documented at the time that this step was being implemented. Allocation rules were not developed and documented during the course of the field test because the author did not believe that their absence represented a critical gap in the Methodology. Three fourths of the available resources or approximately seven and one half hours of methodologist time, and three and three fourths hours of decision maker time was devoted to step 1.6.2. Such a large amount of resources was devoted to this step because it was here that the problems to be solved through the use of the Methodology were to be identified. The remaining resources were allocated among the remaining substeps of step 1.6. The majority of the remaining resources were allocated

to step 1.6.5. In that sub-step, a time table was to be developed for implementing the Methodology for a particular decision maker. The majority of the remaining resources were allocated to this step because such a timetable is critical to the successful implementation of the Methodology. This timetable provides the decision maker with a clear idea of the type of activities that he/she will be performing at different points in the contracting period. This timetable also provides the methodologist with a reasonably operational overview of the work to be performed.

1.6.2 Cycle to major process 2.0 and use the steps of that major process to identify the problems that the decision maker would like to solve during this application of the Methodology.

2.0 Identify problems.

2.1 Plan the implementation of this major process.

2.1.1 Determine the resources that are available for implementing this major step.

There were 4.8 hours or 288 minutes of decision maker time and 9.6 hours or 576 minutes of methodologist time available for the implementation of this major process.

2.1.2 Allocate these resources among the steps of this major process according to the following percentages: (These percentages are based on percentages developed by Coffing [Coffing, Hodson, and Hutchinson, 1973].)

50% to step 2.2

15% to step 2.3

30% to step 2.4

5% to steps 2.5 through 2.8

Using the above percentages as a guide, the available resources were allocated among the steps of this major process as follows: 4.8 hours of decision maker time to step 2.2, .7 hours of decision maker time to step 2.3, 1.4 hours of decision maker time to step 2.4, and .2 hours of decision maker time to steps 2.5 through 2.8.

2.1.3 Confirm the allocation with the decision maker for whom this major process is to be applied.

Mr. Jackson did not request any modifications in the above resource allocation.

2.1.4 Proceed to step 2.2:

2.2 Determine the decision maker's concerns about who needs what according to whom with respect to the problem area of this application.

2.2.1 The methodologist asks the decision maker to write in a list of his/her responses to the question, "Who are the individuals or groups involved in this problem area whose needs are important to you?"

2.2.2 The methodologist asks the decision maker to write in a list his/her responses to the question, "For these persons or groups, what kinds of needs are important to you?"

In thinking about revamping the present Undergraduate Program in Special Education, Mr. Jackson identified the following individuals and groups as having needs that he was interested in meeting. In the context of the Methodology, the people that Mr. Jackson identified are called needers.

1. The directors of other teacher preparation programs.
2. Students involved in the elementary education program.
3. Students involved in programs dealing with early childhood.
4. The staff of such institutions as Belchertown State Hospital.
5. Teachers in the field.
6. Students presently involved in human development programs.
7. BDIC (Bachelor's Degree with Individual Concentration) students.
8. Students of the University Without Walls.
9. Administrators in the field.

In considering the types of needs that the above people might have in the area of revamping the present two year Undergraduate Program in Special Education, Mr. Jackson identified the following as the types of needs that he was interested in meeting.

1. Change in attitude from deficit trainers to asset seekers.
2. Diagnosing.
3. Implementation strategies.
4. Knowledge of the available techniques for implementing 766.
5. Individualization.
6. Demonstration of the fact that you can individualize a class with special students in it.
7. Redefining roles so as to be non-threatening but still effective with respect to getting 766 implemented.
8. Understanding of the scope and depth of the Undergraduate Special Education Program being offered at this institution. (Mr. Jackson believed that this need is specific to the directors of other teacher education programs at this University.)
9. Supportive services from interns. (Mr. Jackson believed that this need was specific to the staff of the Special Education Program.)
10. Determine whether or not a program should be established with students enrolled in the University Without Walls and if a program is established how will the students in such a program be supervised.
11. Knowledge of the consequences of non-compliance with Chapter 766 (Mr. Jackson believed that this need is specific to administrators in the field.)

2.2.3 The methodologist asks the decision maker to write in a list his/her responses to the question, "Given the

persons and needs on your two lists, who would be able to specifically define these needs?"

Mr. Jackson identified the following people as the most appropriate definers of the previously reported needs.

1. Ms. Scottie Torres
2. Mr. Robert Jackson
3. Ms. Kathy McArdle
4. Mr. Frank Schorn
5. Dr. Richard Clark
6. Ms. Jane Moser

2.2.4 Test the completeness of the decision maker's responses.

2.2.4.1 Identify those people whose responses to the above questions would prove helpful.

The purpose of testing the completeness of Mr. Jackson's lists of needers, needs, and definers is to provide him with different perspectives on who might have needs in the area of revamping the Undergraduate Special Education Program, what these needs might be, and who might be the most appropriate definers of the specifics of these needs. Mr. Jackson identified Mr. Frank Schorn and Ms. Kathy McArdle as two individuals whose input might be beneficial.

2.2.4.2 Acquire the responses of those people.

In implementing this step, the author had Mr. Schorn and Ms. McArdle perform steps 2.2.1, 2.2.2, and 2.2.3. The responses of Ms. McArdle will be presented first. In thinking about revamping the present Undergraduate Program in Special Education, Ms. McArdle identified the following groups as having needs that she would be interested in meeting:

1. Older people with experience.
2. Self-directed people.
3. Good salesmen.
4. People who have a good idea of what is going on.
5. Doers--people who want to make change.
6. People who like politics because it's a necessary skill.

Ms. McArdle's responses to the question, "For these persons or groups, what kinds of needs are important to you?" are as follows:

1. Innundation in humanistic and perceptual psychology.
2. Skills in working with people.
3. Lots of practical experience.
4. Technical skills.
5. Support group.

Ms. McArdle identified two people as being appropriate definers for these needs. These people were: 1) Ms. McArdle, and 2) Students enrolled in the undergraduate program.

Mr. Schorn identified the following people as having needs that he was interested in meeting in the area of revamping the present two year Undergraduate Program in Special Education:

1. Members of the Teacher Preparation Program Council at the University of Massachusetts.

2. Ms. McArdle
3. Mr. Jackson
4. Students presently enrolled in the program.
5. Officials of the State Education Department.
6. Dr. Patrick Sullivan (Chairperson for the Transdisciplinary Cluster at the School of Education).
7. Ms. Jane Miller
8. Dr. Gregory Olegy
9. People attached to funding projects.

In Mr. Schorn's opinion, students presently enrolled in the program had the following needs with respect to revamping the program:

1. Specific competencies listed in the program brochure.
2. Developing a positive self-image.
3. Understanding historical perspectives on Special Education.
4. Understanding philosophical perspectives on Special Education.
5. Understanding psycho/social perspectives on Special Education.
6. Communication among the staff.
7. Relate theory to practice.
8. Utilization of microteaching.
9. Integrate the sequence of courses.
10. More effective feedback.
11. Stating objectives clearly.
12. Closure.
13. Needs analysis of program by program staff to determine what the program needs.

14. Restatement of objectives and assumptions based on one year of operation.
15. Review of students profile.
16. Interview students in the program.
17. Greater commitment to teaching.
18. Evaluation procedures.
19. Progress reports.

In Mr. Schorn's opinion, members of the Teacher Preparation Program Council had the following need with respect to revamping the Undergraduate Program:

1. Clear evaluation in terms of behavioral objectives.

In Mr. Schorn's opinion, Ms. McArdle had the following needs with respect to revamping the Undergraduate Program:

1. More materials to work with.
2. More flexibility in the amount of time she can spend.
3. Assistance with some presentations.

In Mr. Schorn's opinion, Mr. Jackson had the following needs with respect to revamping the Undergraduate Program:

1. Allocating administrative trivia.
2. His own office.
3. His own phone.
4. Privacy.
5. More staff.
6. Graduate assistants.
7. Full time secretary.
8. More staff meetings.

9. Periodic staff evaluations.
10. Suggestions for alternative programs.
11. Public relations.
12. Maintaining image.
13. Project funding.
14. Selecting the right staff.
15. Proposal writing.

In Mr. Schorn's opinion, officials of the State Department of Education had the following needs with respect to revamping the Undergraduate Program:

1. How we operationalize 766.
2. How we certify our teachers.
3. Monitoring.
4. Perceive our program as a model and use some of the components in other teacher preparation programs.

In Mr. Schorn's opinion, Dr. Patrick Sullivan had the following needs with respect to revamping the Undergraduate Program:

1. Quality control.
2. Integrate the program into the larger framework of the cluster.

In Mr. Schorn's opinion, Ms. Jane Miller had the following needs with respect to revamping the Undergraduate Program:

1. Establish contacts for undergraduate program--get what Mr. Jackson wants for money.

In Mr. Schorn's opinion, Dr. Gregory Olegy had the following needs with respect to revamping the Undergraduate Program:

1. Exchange of some students.
2. Mutual proposal writing.

Mr. Schorn did not identify specific needs for those people attached to funding projects. Mr. Schorn believed that the best definers of the needs he identified would be the needers themselves. Therefore, his answers to the questions posed in steps 2.2.1 and 2.2.3 were identical.

2.2.4.3 Present the responses to the decision maker and allow him/her to make any changes in the original lists that he/she believes are necessary.

In implementing this step, the author first organized the responses of Mr. Schorn and Ms. McArdle into three categories. These categories are: their collective responses to the question posed in step 2.2.1, their collective responses to the question posed in step 2.2.2, and their collective responses to the question posed in step 2.2.3. The author then presented each of these response categories to Mr. Jackson. Finally, the author asked Mr. Jackson to make any changes in his original lists of needers, needs, and definers that he believed are necessary, given Mr. Schorn's and Ms. McArdle's lists of needers, needs, and definers. Mr. Jackson added the 2nd, 3rd, 4th, 5th, 6th, and 7th entries from Mr. Schorn's list of needers to his original list of needers. With respect to needs, Mr. Jackson added to his list the following entries from Mr. Schorn's list of needs: the need for clear

evaluation in terms of behavioral objectives, the need for more materials to work with, the need for project funding, and the need for certifying our teachers. Mr. Jackson added the 2nd entry from Ms. McArdle's list of definers and the 7th entry from Mr. Schorn's list of definers to his own list of definers.

2.2.5 The decision maker picks the most important entries on each list.

Mr. Jackson selected the following people as those whose needs are most important to him with respect to revamping the present two year Undergraduate Program in Special Education:

1. Other program directors.
2. Students in elementary education.
3. Teachers in the field.
4. Special Education students.
5. Ms. McArdle.
6. Ms. Miller.
7. Mr. Jackson.

For the above people, Mr. Jackson selected the following needs as being important to him with respect to revamping the present Undergraduate Program in Special Education:

1. Change in attitude from deficit trainers to asset seekers.
2. Understanding the scope and depth of the Undergraduate Program in Special Education.

3. Supportive services from the interns.
4. Establishing contacts for funding.
5. Evaluation.

Mr. Jackson believed that the following people could best define the specifics of the above needs:

1. Ms. Scottie Torres
2. Mr. Jackson
3. Ms. McArdle
4. Mr. Frank Schorn
5. Ms. Jane Miller

2.2.6 Using the above information, the methodologist constructs sentences in the form of "Who needs what according to whom."

The number of sentences that can be constructed equals the number of needers times the number of needs times the number of definers. Thus, 175 sentences were constructed using Mr. Jackson's lists of seven needers, five needs, and five definers. Because of the large number of sentences, they will not be presented here. However, a complete list of these needs sentences is presented in Appendix Five.

2.2.7 The decision maker prioritizes the list of sentences constructed.

A minor difficulty was encountered in having Mr. Jackson prioritize the list of 175 needs sentences. The difficulty was minor in the sense that it did not prevent this step from accomplishing its purpose which is to have the decision maker choose those sentences that he/she believes represent the most important problems from within the problem area. The difficulty encountered was that the prioritizing of 175 separate needs sentences was a very tedious task. When Mr. Jackson was asked to prioritize these sentences, he made a comment to that effect. The author concurred and in considering the problem asked Mr. Jackson how it could be solved. Mr. Jackson proposed the following strategy. First divide the sentences into three categories; those that are most important, those that are relatively important, and those that are least important. Then select the most important sentences from the first category. In implementing this step, the author permitted Mr. Jackson to carry out the proposed strategy because the author did not believe that that strategy was inconsistent with the purpose of the step. As a result, Mr. Jackson selected sentences 7, 8, 9, 27, 28, 29, 32, 33, 34, 51, 52, 53, 54, 55, 71, 74, 77, 78, 79, 82, 83, 84, 141, 142, 145, 166, and 170 as the most important; sentences 2, 3, 4, 24, 61, 62, 63, 64, 99, 117, 118, 132, 133, 134, and 135 as relatively important; and sentences 49, 57, 58, 59, 103, 127, 130, 149, and 174 as least important. From the first category, Mr. Jackson selected sentences 166 and 170 as being most critical. Sentence 166 was "Mr. Jackson's needs for funding contacts according to Ms. Torres." Sentence 170 was "Mr. Jackson's needs for funding contacts according to Ms. Miller." Sentences not included in these categories were those that Mr. Jackson had decided were unimportant to him with respect to revamping the present Undergraduate Program in Special Education.

The way the above problem was solved indicates how Decision Making Methodology can be further developed through a cooperative effort between a competent decision maker and a trained methodologist. As was mentioned in Chapter Three, "The Design Of The Study," this field test was to be carried out in an uncomplicated situation. Applying the Methodology for a decision maker, who in the author's opinion is relatively or highly competent, represents a less complicated application of the Methodology than applying the Methodology for a decision maker whom the author believes is relatively or highly incompetent. One of the reasons for selecting Mr. Jackson as the decision maker for whom the Methodology would be applied during the course of the field test was that the author believed him to be a highly competent decision maker. If a problem arises while applying the Methodology for a highly competent decision maker, that decision maker by reason of his/her competence may provide useful insights into how the problem may be solved. Such was the case with Mr. Jackson. The insights of Mr. Jackson were used for the purpose of developing a more practical strategy for implementing the above step in the situation of the field test. This is an illustration of how the insights of the decision maker can be used to develop a more complete version of the Methodology.

Decision Making Methodology uses the judgements and insights of the decision maker in two ways. First, the judgement of the decision maker is the primary source of data used throughout the application of the Methodology. This fact was discussed at a general level in Chapter One, "Decision Making And Decision Making Methodology: How They Are Related" and was illustrated at the level of specific methodological pro-

cedures in Chapter Two, "Decision Making Methodology: A Detailed Analysis." Second, the relevant insights of competent decision makers are used for the purpose of further developing the Methodology.

The problem discussed above illustrates that this step is in need of a practical set of sub-steps for its implementation. The needed sub-steps were not developed during the course of the field test because the author did not believe that they would be difficult to develop. In fact, the recommendations of Mr. Jackson may be viewed as the initial draft of the needed sub-steps. Thus, some development has already been done. The problem is presented here so as to provide a complete documentation of the implementation of step 2.2.7.

2.2.8 The decision maker chooses the first/next sentence.

Of the two need sentences that Mr. Jackson chose, he decided to work on 166 first.

2.2.9 The decision maker is asked to review the sentence to make sure that he/she is committed to having defining and measurement done on that sentence.

In reviewing sentence 166, Mr. Jackson confirmed his commitment to having defining and measurement done on that sentence.

2.2.10 The decision maker confirms the sentence with any other individuals or groups that he/she wishes to.

This step was not implemented because Mr. Jackson did not believe that he needed to confirm the sentence with any other individuals or groups.

2.2.11 The methodologist secures the cooperation of needers and definers.

In sentence 166, Mr. Jackson was the needer while Ms. Torres was the definer. The cooperation of Mr. Jackson had already been secured. The author contacted Ms. Torres by phone to determine if she would be willing to work with the author for the purpose of detailing what she believed to be the specifics of Mr. Jackson's needs for funding contacts. Ms. Torres confirmed her willingness to work with the author.

2.3 Define whose needs for what according to whom.

2.3.1 Develop the defining stimulus.

2.3.1.1 The methodologist asks the decision maker to state the decision maker's purpose for obtaining data in relation to this sentence.

In implementing this step, the author asked Mr. Jackson how might he use Ms. Torres definition of his needs for funding contacts. Mr. Jackson replied that the definition would be used in his writing of grants for Special Education services. Mr. Jackson believed that for the most part, such grants could not be written without adequate funding contacts. Thus, the purpose that Mr. Jackson had in mind for obtaining data on his needs for funding contacts was to enable him to write fundable grants for

2.3.1.2 The methodologist develops a hypothetical situation appropriate to the decision maker's stated purpose.

The hypothetical situation which would be appropriate to Mr. Jackson's purpose would be one in which he would be writing grants for Special Education services.

2.3.1.3 The methodologist inserts the who and the whom into the situation.

In sentence 166, the who (needer) was Mr. Jackson and the what (need) was that of funding contacts. By inserting these two pieces of information into the hypothetical situation, the situation became, "Imagine that Bob is writing grants for Special Education services and as he is writing these grants, all his needs for funding contacts are being met."

2.3.1.4 The methodologist determines how the definer should observe the situation.

Mr. Jackson believed that the definer could best supply him with useable needs data by simply observing mentally the imagined situation. For this reason, the following sentence was added to the defining stimulus: "Picture this situation in your mind and describe all the things that indicate to you that Bob's needs for funding contacts are being satisfied."

2.3.1.5 The methodologist uses the above information to construct a defining stimulus of the following form: "Imagine (the hypothetical situation) and in that situation imagine that (name of the needer)'s needs for (need being defined) are fully met. Observe that situation (in the manner specified in step 2.3.1.4). What are all the things in that situation that indicate to you that (name of the needer)'s needs for (type of need being defined) are fully met.

The following stimulus was constructed from the information generated in steps 2.3.1.1 through 2.3.1.4 for need sentence 166; "Imagine that Bob is writing grants for Special Education services and as he is writing these grants, all of Bob's needs for funding contacts are being met. Picture this situation in your mind and describe all the things that indicate to you that Bob's needs for funding contacts are being satisfied."

2.3.1.6 The methodologist asks the decision maker to approve the defining stimulus. If the stimulus is not satisfactory, then the methodologist should change it so that it is. Changes made should be determined by the decision maker.

Mr. Jackson had no objection to the stimulus that had been developed for needs sentence 166. He believed that the stimulus would elicit from the definer, a series of components that would provide him with a clearer and more comprehensive understanding of his needs for funding contacts.

2.3.2 Have the definer respond to the defining stimulus.

2.3.2.1 Set up a meeting with the definer.

2.3.2.2 Have the definer respond to the stimulus.

2.3.2.3 Record the definer's responses.

2.3.2.4 Have the definer prioritize his/her responses on the basis of importance.

In implementing the above steps, Ms. Torres identified two components of Mr. Jackson's needs for funding contacts. These components are:

1. Knowledge of priorities and availabilities of State and federal funds.
2. Establishing inroads into sources of funds.

2.3.2.5 Check the prioritized components for clarity.

2.3.2.6 If the resources permit further operationalize fuzzy components starting with the one having the highest priority.

2.3.2.7 If the resources permit have the definer prioritize any new responses.

Neither of the above components were operationally defined. Two additional cycles of operationalization and prioritization were carried out because the resources and desire of Ms. Torres permitted it. The first cycle resulted in sub-components for each component. The second cycle generated specific items under each sub-component. The prioritized sub-components and prioritized sub-component items are as follows:

1. Knowledge of priorities and availabilities of State and federal funds.
    - 1.1 Know people who can give reliable information such as:
        - 1.1.1 Ms. Torres
        - 1.1.2 Kathy Fitzgerald
        - 1.1.3 Paul Cauette
        - 1.1.4 Pete Demures
        - 1.1.5 Mike Moriarty
        - 1.1.6 Bob Audette
        - 1.1.7 Dan Burk
        - 1.1.8 Art Eve
        - 1.1.9 Janet Owens
    - 1.2 Know specific monies that Bob can link up with.
        - 1.2.1 Title 6B-Innovative Programs-Kathy Fitzgerald.
        - 1.2.2 89313-Federal money to private schools and institutions-Jack Burk.
        - 1.2.3 Title 6D-Inservice-Carrolyn Scott.
        - 1.2.4 Deaf-Speech-Language-Dr. Anise Hagerty.
        - 1.2.5 Title 6E-Research Money (No specific contact mentioned).

1.2.6 4A-Social Service Welfare (No contact mentioned).

1.2.7 Minority money-multi-racial, multi-cultural education for children with special needs (Ms. Torres).

2. Establishing inroads into sources of funds.

2.1 Getting out of the University.

2.1.1 Know Jene Thayer of the State Advisory Commission on Special Education.

2.1.2 Know Don Snider of the State Advisory Commission on Special Education.

2.1.3 Come to staff meetings that Ms. Torres would be willing to set up.

2.1.4 Come to individual meetings with Special Education directors and LEA's to explain how the diagnostic prescriptive teacher model can meet their needs.

2.2 Extend your contacts.

2.2.1 Establish contacts at the Council for Exceptional Children.

2.2.2 Identify existing national contacts.

2.2.3 H.E.W.

2.2.4 Council for Political Action which coordinates all Special Education funding. Ms. Torres is the Massachusetts representative to the Council.

2.3 Find out school district needs.

2.3.1 Conduct your own needs analysis.

2.3.2 Use Ms. Torres' needs analysis of what Special Education programs want.

2.3.3 Use Ms. Torres' needs analysis of what are the in-service needs of Special Education programs.

The way in which the above information is organized, that is by components, sub-components, and operational items, is the way in which it was reported to Mr. Jackson.

2.3.2.8 Record all problems encountered in the defining process as well as any additional comments made by the definer regarding the need or the process.

No serious problems were encountered during the defining process carried out with Ms. Torres. This fact was conveyed to Mr. Jackson when the author reported to him the specifics of Ms. Torres' definition of his needs for funding contacts.

2.3.3 Report the definer's definition to the decision maker.

2.3.3.1 Write the report.

2.3.3.1.1 Compile the results of the defining process.

2.3.3.1.2 Write a statement of the procedures used to obtain the definition.

2.3.3.1.3 Document all problems, difficulties, and limitations encountered in the process.

2.3.3.1.4 Compile the above in the following sequence; whom what whom sentence, stimulus, definition, and problems.

The information contained in the definition report has already been presented. Therefore, the report itself will not be presented here.

2.3.3.2 Present the report to the decision maker offering to answer any questions.

Mr. Jackson had no questions with respect to the definition report on the needs sentence, "Bob's needs for funding contacts according to Ms. Torres."

2.4 Measure the degree to which the definition of the need is being met.

2.4.1 Choose the components to be measured.

In examining Ms. Torres' definition of his needs for funding contacts, Mr. Jackson identified one item that he was interested in. The item chosen was item #1, "Knowledge of priorities and availabilities of State and federal funds." In reviewing this item, Mr. Jackson believed that it should be broken into two sub-items. These sub-items were: 1) Knowledge of availability and priority of State funds, and 2) Knowledge of availability and priority of federal funds.

Rather than initiate measurement on these two components, Mr. Jackson decided that the defining process should be carried out on the one remaining need sentence, since both sentences dealt with Mr. Jackson's need for funding contacts. The only difference between the two sentences is that each called for different definers. In the second sentence, Ms. Jane Miller was the definer. Mr. Jackson believed that Ms. Miller's

definition would provide him with a more complete list of the possible components of his need for funding contacts. Mr. Jackson also believed that a more complete list of components would increase his changes of choosing components that were truly important to him. Therefore, the author cycled back to step 2.2.8 and repeated the defining process for the remaining need sentence.

2.2.8 The decision maker chooses the first/next needs sentence.

"Bob's needs for funding contacts, according to Ms. Miller," was the only need sentence on which defining and measurement remained to be done.

2.2.9 The decision maker is asked to review the sentence to make sure that he/she is committed to having defining and measuring done on that sentence.

Mr. Jackson was highly committed to having defining and measuring done on this sentence, especially since Ms. Torres' definition of his needs for funding contacts had only contained one component that he believed was appropriate to his decision making situation.

2.2.10 The decision maker confirms the sentence with any other appropriate individuals of groups that he/she wishes to.

This step was not implemented because Mr. Jackson did not believe that he needed to confirm the sentence with any other individuals or groups.

2.2.11 The methodologist secures the cooperation of needers and definers.

Both Mr. Jackson, the needer, and Ms. Miller, the definer, were ameanable to working with the author during the defining and measurement process.

2.3 Define whose needs for what according to whom.

2.3.1 Develop the defining stimulus.

The same defining stimulus was used with Ms. Miller as was used with Ms. Torres. The use of the same stimulus was possible for a number of reasons. First, Mr. Jackson had the same purpose in mind for using the definition provided by both definers. That purpose was the writing of grants for Special Education services. Because Mr. Jackson had the same purpose with respect to each sentence, the same hypothetical situation could be used in each stimulus. Second, the needer and the need were identical in both sentences. In both, Mr. Jackson was the needer while the need was that of funding contacts. Finally, the way in which the definer was to observe the situation was to be the same in both defining stimuli. Mr. Jackson believed that Ms. Miller could best observe the situation by observing it occurring in her mind. This was the same method of observation used in the stimulus presented to Ms. Torres.

2.3.2 Have the definer respond to the defining stimulus.

2.3.2.1 Set up a meeting with the definer.

2.3.2.2 Have the definer respond to the stimulus.

2.3.2.3 Record the definer's responses.

2.3.2.4 Have the definer prioritize his/her responses on the basis of importance.

In implementing the above step, Ms. Miller identified seven components of Mr. Jackson's need for funding contacts. These components are:

1. Get other administrative tasks taken care of before you go after monies.
2. More outreach.
3. Pick up on interest in the area.
4. Function on what is generated by outreach.
5. Develop fundable graduate programs in Special Education.
6. Writing proposals.
7. Get federal funds.

2.3.2.5 Check the prioritized components for clarity.

2.3.2.6 If resources permit further operationalize fuzzy components starting with the one having the highest priority.

2.3.2.7 If resources permit, have the definer prioritize any new responses.

In examining the seven items composing Ms. Miller's initial definition of Mr. Jackson's needs for funding contacts, the author decided, and Ms. Miller agreed, that they were all fairly ambiguous. Therefore, additional defining was done on each item. This additional work was halted when the resources available for defining were exhausted. The following is a prioritized list of the additional items generated.

1. Get other administrative tasks taken care of before you go after monies.
    1.1 Define administrative and/or organizational roles.
        1.1.1 Define the roles of teaching assistants.
        1.1.2 Define the roles of oncoming faculty members.
        1.1.3 Define the objectives of the graduate/doctoral program.
        1.1.4 Define the objectives of the undergraduate program.
        1.1.5 Define the utilization of other cluster personnel.
2. More outreach.
    2.1 Get out of this area.
    2.2 Establish more contacts with State agencies.
    2.3 Maintain more contacts with school systems.
    2.4 Follow up requests for visits from schools.
3. Pick up on interest in the area.
    3.1 Follow up on possibilities at the University first.
        3.1.1 Art Eve
        3.1.2 Atron Gentry
    3.2 Know State priorities for 766.
    3.3 Know federal priorities for 766.
    3.4 Perform a needs analysis.

3.5 Determine if the inservice master's program is generating interest in Special Education Program.

3.6 Conduct workshops.

4. Function on what is generated by outreach.

4.1 Document interest and use it as a validation for funding.

4.2 Consult with school systems.

4.3 Design workshops but don't necessarily give them yourself.

4.4 Develop one child evaluations.

5. Develop fundable graduate programs in Special Education.

5.1 Develop administrative/supervisory programs in Special Education because of federal interest in such.

5.2 Develop an urban Special Education Program.

5.3 Develop programs that have not been done before.

5.4 Develop programs that there is a need for.

5.5 Develop accountability programs for Special Education.

6. Writing proposals.

6.1 Boston has an agency for referal to sources of money and for providing technical assistance in writing grants. This is made up of consultants from M.I.T. and Harvard.

6.2 Determine your strengths and resources first.

6.3 Determine needs.

6.4 Write when there is a need.

6.5 Teach grantsmanship.

7. Get federal funds.

7.1 Use already set up pathways.

7.1.1 Your own contacts in D.C.

7.1.2 People here at the University.

7.1.3 Pull in funds to demonstrate federal interest.

7.1.4 Go through the University to get federal funds.

2.3.2.8 Record all problems encountered in the defining process as well as any additional comments made by the definer regarding the need or the process.

No serious problems were encountered during the defining process carried out with Ms. Miller. This fact was conveyed to Mr. Jackson when the author reported to him the specifics of Ms. Miller's definition of his needs for funding contacts.

2.4 Measure the degree to which the definition of the need is being met.

2.4.1 Choose the components to be measured.

In examining Ms. Miller's definition of his needs for funding contacts, Mr. Jackson chose items 3.2 and 3.3 as two which he would like to see measured. Mr. Jackson then added these components to the two components that he had selected from Ms. Torres' definition of his need for funding contacts.

2.4.3 Prioritize the chosen components.

Mr. Jackson prioritized the chosen components on the basis of the importance which he believed that each had with respect to his meeting his needs for funding contacts. The resultant prioritization is as follows:

1. Knowledge of State priorities for 766.
2. Knowledge of federal priorities for 766.
3. Knowledge of priorities and availabilities of State funds.
4. Knowledge of priorities and availabilities of federal funds.

2.4.4 Review the prioritized components to make sure that the decision maker is committed to measuring these components.

Mr. Jackson was committed to measuring these components especially since he believed that if these components were completely satisfied, then his needs for funding contacts would be fulfilled.

2.4.5 Confirm the prioritized components with any relevant others chosen by the decision maker.

This step was not implemented for the same reason that step 2.2.10 was not implemented.

2.4.6 Allocate the available resources to the chosen components.

According to the resource allocation developed in step 2.1.2, there were ninety six minutes of decision maker time and one hundred and ninety two minutes of methodologist time available for the implementation of this step. Mr. Jackson decided to allocate his resources among the components equally. The author also allocated his resources equally among the components to be measured. Thus, each component was allocated twenty four minutes of decision maker time and fourty eight minutes of methodologist time for the purpose of measurement.

2.4.7 Review the allocation.

Mr. Jackson did not request any change in the resource allocation developed in the previous step. He believed that the allocation accurately reflected the amount of time that should be expended in the measurement of each component.

2.4.8 Choose the first/next component to be measured.

Mr. Jackson was the needer referred to in each of the four components to be measured. The needs themselves were also similar. They each involved Mr. Jackson's knowledge of some source of information. Need components one and two involved Mr. Jackson's knowledge of State and federal priorities for implementing 766. Need components three and four involved Mr. Jackson's knowledge of the priorities and availabilities of certain types of funds. Given these similarities, Mr. Jackson believed that these components could be measured at the same time. The author concurred and then he and Mr. Jackson established a time when they could

both expend their respective resources for the purpose of measuring the degree to which each of these components were presently fulfilled.

2.4.9 Determine on the basis of available resources whether the component is to be measured using short form procedures or long form procedures. If short form procedures are to be used, proceed to 2.4.10. If long form procedures are to be used, proceed to step 2.4.11.

The terms "short form" and "long form" refer to the complexity of the measurement procedures to be used. Long form or complex measurement procedures are to be used in situations in which large amounts of resources are available. In the measurement of needs, a large amount of resources has been defined, with respect to the resource of time as more than one hour of methodologist time (Coffing, Hodson, and Hutchinson, 1973, Hodson, 1974). In this situation, emperical measurement of the degree to which a need is fulfilled is possible. However, emperical measurement is very difficult when the available methodologist time is less than one hour. In small resource situations, ones in which there is less than one hour of methodologist time, estimation is the measurement technique used. This technique involves having the definer make a judgement as to the extent to which a need is accomplished. Due to the amount of resources available for measuring the chosen components estimation was to be the measurement technique to be used.

2.4.10 Ask the definer to estimate the degree to which the component is met.

The components to be measured were generated by two different definers. Components one and two were generated by Ms. Torres. Components three and four were generated by Ms. Miller. When the measurement of these components was to take place, neither of these definers were available. In discussing this problem with Mr. Jackson, he believed that he could assume the role of the definer in the measurement process. Mr. Jackson based his belief on the fact that he is the needer and as needer should be able to provide valid qualitative insights into the degree to which his needs are presently fulfilled. Thus, Mr. Jackson assumed the role of the definer in the measurement process. In estimating the degree to which each of the four needs are met, Mr. Jackson decided that none of them were met to any significant degree. Thus, the degree of accomplishment for each need was recorded as zero.

In short form measurement procedures, the estimator is the one who is most knowledgeable of the degree to which a particular need of a particular needer is met. Such a person will usually have had a substantial degree of direct contact with the needer. In most cases, the definer of a need will fulfill this qualification. If and when a definer is unable to participate in the estimation process, as was the case in this field test, the criterion on which a substitute is to be chosen should be that of knowledge of the degree to which a particular need is met. It seems logical to assume that one of the persons other than the definer who would have a great understanding of the degree to which a particular need is met would be the needer. This point is stressed so as to provide a guideline for solving this problem should it arise in future applications of the Methodology.

2.5 Recycle to 2.2.8 and repeat the defining and measuring process for any other sentences that the decision maker would like to examine.

This step was not implemented because no other sentences remained to be examined. What was done was to proceed to the next step.

2.6 Prioritize all problems that have been identified through the above steps.

In this Decision Making Methodology, problems are defined as unmet needs. The priorities that Mr. Jackson gave the four needs that were measured in step 2.4.10 are as follows:

1. Knowledge of State priorities for 766.
2. Knowledge of federal priorities for 766.
3. Knowledge of priorities and availabilities of State funds.
4. Knowledge of priorities and availabilities of federal funds.

2.7 Evaluate the implementation of this major process.

The effectiveness of this major process was not evaluated through the use of a formalized set of procedures. The process used was the author's determination of whether or not this major process had accomplished its purpose which is to identify those problems to which the

decision maker would like to have the Methodology applied during a given application. This author has intrepreted the existence of a prioritized list of problems as indicative of the fact that this major process has accomplished its purpose.

2.8 Cycle back to step 1.6.7 and choose the next piece of work to be done:

1.6.7 Choose the next piece of work to be done.

1.6.7.1 Determine the decision makers that are available at this time.

1.6.7.2 Choose the highest priority decision maker.

1.6.7.3 Confirm the availability of this decision maker.

Mr. Jackson was the only, and therefore the highest, priority decision maker for whom the Methodology was being applied during this field test.

1.6.7.4 If steps 1.6.1 through 1.6.6 have been carried out with the decision maker, then a plan for implementing the Methodology for that decision maker will have been developed. In this case, the methodologist should review the plan and compile a list of options as to those sections of the Methodology that can be carried out with the decision maker at this time. If steps 1.6.1 through 1.6.6 have not been carried out, then they should be implemented at this time.

Steps 1.6.3 through 1.6.6 had not been implemented with Mr. Jackson. Therefore, the author began carrying out these steps beginning with step 1.6.3.

> 1.6.3 Allocate the resources that are available for implementing the Methodology among the problems that have been identified.

Approximately four hours of Mr. Jackson's time had been used in applying the Methodology to this point. This left approximately forty four hours of decision maker time yet to be used. This time was distributed among the problems to be solved according to the following allocation: problem number one, twelve hours; problem number two, twelve hours; problem number three, ten hours; and problem number four, ten hours. In reviewing this allocation, Mr. Jackson decided to devote one additional hour of his time to the application of the Methodology. This additional hour was allocated to the fourth problem. Thus, eleven rather than ten hours of Mr. Jackson's time was to be devoted to helping him identify the priorities and availabilities of federal funds.

In reviewing the above resource allocation, the author identified a critical gap in the long form of the Methodology. As has been mentioned, the long form of Decision Making Methodology is designed for use in situations where a decision maker has more than twenty three hours available for solving a particular problem. According to the above allocation, an amount of time equal to or in excess of twenty three hours was not available for solving any of the problems that Mr. Jackson was interested in.

Therefore, long form procedures were inappropriate and short form procedures needed to be used. Although short form procedures had been developed and documented at the time of the field test, there was no mechanism for cycling the decision maker from the long form to the short form if and when it became apparent that there were insufficient resources for using the long form. This problem represented what the author believed to be a critical gap in the Methodology.

A two part solution was developed to fill this gap. The first part involved revising step 1.6.3 to read:

> 1.6.3 Allocate the resources that are available for implementing the Methodology among the problems that have been identified. For problems that have twenty three hours or less of decision maker time allocated to them, short form procedures should be used. For problems which have more than twenty three hours of decision maker time allocated to them, long form procedures should be used.

The change in step 1.6.3 provided a new methodological procedure for solving the problem of having to change from long form to short form procedures at a particular point in the Methodology at which that problem was found to occur. The second part of the solution involved a change in step 1.5.8.6.2. It was in this step that the contingencies under which the contract could be altered are explained to the contract decision maker. The change in this step was one of elaboration. The new version of this step cited a particular contingency which applied to the above problem. The new version of step 1.5.8.7.2 is as follows:

1.5.8.7.2 Explain to the contract decision maker the contingencies under which the terms of the contract may be altered. One such contingency would be a decrease in the available resources of the magnitude that required a change from long form procedures to short form procedures.

The change in step 1.5.8.7.2 alerts the decision maker to the possibility of encountering a problem of the type previously discussed before that problem actually arises.

The changes in both steps illustrate a unique aspect of Decision Making Methodology; namely that the Methodology adapts to the decision maker's environment rather than the other way around. The Methodology does not coerce or demand that the decision maker manipulate his/her environment so that it is consistent with the Methodology. When the amount of resources available for the solution of specific problems changes the application of the Methodology is not terminated, rather the application of the Methodology is tailored to this new resource situation.

The changes in both steps also illustrate a fundamental characteristic of methodological development, that is, the point at which Decision Making Methodology will be considered fully developed. Once this Decision Making Methodology has procedures for successfully dealing with all decision makers and decision making environments, then the Methodology will have been fully developed. Prior to this field test, the Methodology had no procedures for cycling from its long form to its short form. The need for such cycling may arise quite often in the sense that a methodologist may encounter this problem in many different decision making environments. The lack of methodological procedures to deal with this problem is indica-

tive of the Methodology's incompleteness in a certain area. The development of procedures for solving this problem is indicative of the completeness of the Methodology increasing; of further development going on; of a perfect Decision Making Methodology being designed.

To solve this cycling problem, the author implemented the new version of step 1.6.3 and initiated the usage of short form procedures. The short form of Decision Making Methodology is composed of the following eight major processes:

1. Planning.
2. Identify problems.
3. Develop a purpose statement.
4. Generate alternative solutions.
5. Choose the most appropriate solution.
6. Develop an operational design for the chosen solution.
7. Implement the solution.
8. Evaluate.

The second major process of the short form and the second major process of the long form have the same purpose; that is to identify those specific problems that the decision maker would like to solve during the application of the Methodology. The difference between these major processes is that the process used in the long form to identify problems is more complex than the problem identification process used in the short form. This difference in complexity is due to the amount of available resources. With large amounts of available resources, as is the case with the long form, a complex problem identification process can be used. Such is not the case with the short form.

The application of the short form began with those procedures whose purposes had not yet been accomplished. Since the second major process of both the long form and the short form have the same purpose and because the second major process of the long form had already been successfully implemented, the logical point for starting the application of the short form would be major process three.

Results of Implementing the Short Form

Results of Implementing Major Process 3.0: "Develop a Purpose Statement" for the Highest Priority Problem of the Decision Maker

> 3.0 Determine a statement of the purpose with respect to the problem area with which this application of the Methodology will deal.
>
> 3.1 Determine from the Resource Allocation Chart the time available for this step. All of step 3.0 must be accomplished within this amount of resources.

The Resource Allocation Chart is a table that lists the percentages of the total amount of resources to be allocated to major processes two through eight of the short form of the Methodology. The format of the chart is as follows:

Figure 3

Blank Resource Allocation Chart

Process	%	Hours
Identify Problems	10	
State Purpose	2	

Alternative Solutions	10
Choose Solution	10
Operational Design	18
Implement Design	40
Evaluation	10

Were the application of the short form beginning with the first major process, the Resource Allocation Chart would have been filled out during that major process. However, since the first major process of the short form had not been carried out, a resource allocation chart needed to be developed for each of the four problems that Mr. Jackson was interested in solving. The resource allocation charts that were developed were as follows:

Figure 4

Resource Allocation Chart
Problem #1: Knowledge of State Priorities for 766

Process	%	Hours
State Purpose	2	.25
Alternative Solutions	10	1.20
Choose Solution	10	1.20
Operational Design	18	2.16
Implement Design	40	4.80
Evaluation	10	1.20
Unallocated Resources	10	1.20

Figure 5

Resource Allocation Chart
Problem #2: Knowledge of Federal Priorities for 766

Process	%	Hours
State Purpose	2	.25
Alternative Solutions	10	1.20
Choose Solution	10	1.20
Operational Design	18	2.16
Implement Design	40	4.80
Evaluation	10	1.20
Unallocated Resources	10	1.20

Figure 6

Resource Allocation Chart
Problem #3: Knowledge of Priorities and Availabilities of State Funds

Process	%	Hours
State Purpose	2	.20
Alternative Solutions	10	1.00
Choose Solution	10	1.00
Operational Design	18	1.80
Implement Design	40	4.00
Evaluation	10	1.00
Unallocated Resources	10	1.00

Figure 7

Resource Allocation Chart
Problem #4: Knowledge of Priorities and Availabilities of Federal Funds

Process	%	Hours
State Purpose	2	.21
Alternative Solutions	10	1.10
Choose Solution	10	1.10
Operational Design	18	1.98
Implement Design	40	4.40
Evaluation	10	1.10
Unallocated Resources	10	1.10

Approximately 10% of the resources provided for solving each problem was not allocated to a particular major process of the Methodology. The unallocated resources were those that would normally be consumed in the implementation of major process two, "Identify Problems." Since specific problems had already been identified, there was no need to implement this major process. Thus, a certain amount of resources were unallocated. Mr. Jackson did not make any decisions regarding the use of these resources at this time. He believed that such a decision could be better made at some later date.

At this point, a minor gap was discovered in the short form of Decision Making Methodology. The gap identified was one of completeness. The planning procedures of the short form are incomplete. These planning procedures provide no strategy for deciding what sections of the Methodology are to be applied to what problems at what points during the applica-

tion. A similar gap was identified during the logical analysis of the long form of the Methodology. Its planning procedures were also found to be incomplete. New methodological procedures were designed to fill this gap. Because similar gaps were identified in both short and long forms, the author believed that similar procedures could be used to fill both gaps. Thus, what may be needed to fill the gap identified in the planning procedures of the short form is to integrate the new planning procedures of the long form into the short form. Thus, some initial work on filling the gap in the short form has already been done. Specific procedures were not designed to fill this gap because the author did not consider these procedures to be difficult to design, due to the fact that some initial work had already been done on filling the gap.

During the field test, Mr. Jackson decided that the best way to sequence the application would be to solve the highest priority problem first, the second highest priority problem second, the third highest priority problem third, and the fourth highest priority problem last. Therefore, at this point, the second major process of the short form was applied to problem #1. Thus, the problems were to be solved sequentially according to their priorities. The fifteen available minutes were distributed equally among these steps resulting in three minutes being allocated to each. The results of the usage of these steps appears below. As indicated above, there was only fifteen minutes available for the implementation of major process two. This major process consisted of six major steps, five of which still remained to be implemented.

3.2 If resources allow, the decision maker should do at least one of the following tasks to determine the nature of the problem area:

3.2.1 Read literature in the area.

3.2.2 Talk to people who work in the area.

3.2.3 Examine work being done in the area.

Mr. Jackson and the author decided that three minutes was not enough time to perform any of the above activities. Therefore, the above step was not implemented. Mr. Jackson decided to allocate the saved resources to later steps in this major process.

3.3 The decision maker uses the results of this analysis (3.2) and the results of the definition of needs (the definition of needs page of the workbook) to help him/her state the purpose that he/she has in dealing with the problem area. The rest of this application of the Methodology will be designed around this statement of purpose in order to deal effectively with the problem, e.g., the decision maker might choose to meet the need that was rated most unmet.

The purpose that Mr. Jackson had for dealing with the problem of knowledge of State priorities for implementing 766 was "to know State priorities for implementing 766." Mr. Jackson believed that if this purpose were accomplished, the problem would be solved.

3.4 The decision maker tests the purpose against the following criteria:

- is it desirable?
- is it definable?
- is it practical?

3.5 The decision maker revises the purpose and if necessary, recycles through 3.4.

The resources not used in step 3.2 were used here. A purpose is desirable if a decision maker is truly committed to accomplishing it. A purpose is definable if a decision maker has a reasonably clear idea of the purpose's meaning; and a purpose is practical if it can be accomplished within the available resources. Mr. Jackson believed that the purpose "to know State priorities for implementing 766" met all these criteria.

3.6 Once all the answers to the questions in 3.4 are yes, write the purpose in the workbook.

In the short form of the Methodology, a workbook or decision making log is provided. The purpose of the workbook is to record the decision maker's responses to certain methodological procedures. A blank workbook is provided in Appendix One which also contains the version of the short form used in this field test. In implementing this step, the exact wording of the purpose was recorded in the appropriate section of the workbook.

Results of Implementing Major Process 4.0:
"Generate Alternative Solutions" for the
Highest Priority Problem of the Decision Maker

4.0 Develop alternative solutions.

4.1 Determine the amount of resources available for this step from the Resource Allocation Chart. All of step 4.0 must be accomplished within this amount of time.

4.2 Determine the solutions to the purpose.

4.2.1 Put down on a piece of paper all the solutions that you would label usual solutions. This includes solutions that you have tried in the past with a similar problem.

4.2.2 Put down all the ways that you can possibly accomplish the purpose. You are looking for usual solutions to the problem.

4.2.3 If resources allow, on a second piece of paper write out all the ways that you could fail to accomplish the purpose.

4.2.4 If step 4.2.3 was performed, look at the list of ways that you could fail to accomplish the purpose and use this list to produce solutions for the purpose.

4.3 Producing a final list of alternatives.

4.3.1 Look at all the lists and test for redundant solutions. Cross out all but one of the redundant solutions in each case of redundancy.

4.3.2 Enter in the workbook the list of alternative solutions.

According to the Resource Allocation Chart, seventy two minutes of decision maker time were available for developing a list of alternative solutions. Since the author had planned to devote twice as much of his own time to the application of the Methodology as was devoted by the decision maker, there were one hundred and forty four minutes of the author's time available for the development of a list of alternative solutions. In examining the above steps, the author realized that all of his available time would not be consumed in their implementation. This realization was based on the fact that the steps themselves were neither so complex or so extensive that they would require one hundred and fourty four minutes for their implementation.

The author discussed the problem with Mr. Jackson, mentioning that one use to which the excess resources could be put to would be for the author to acquire additional lists of alternative solutions from people whose judgement and knowledge Mr. Jackson respected. Mr. Jackson considered the proposal viable and identified the following pecple as those from whom the author should gather additional lists of alternative solutions: Joe Rice, Pete Demiers, Mike Moriarty, Scottie Torres, Paul Cauette, and Janet Owens.

Before implementing this step, Mr. Jackson decided that the resources that he had available for developing a list of alternative solutions were to be consumed in a single meeting. This decision had implications for when the author would acquire the additional lists of alternative solutions. These lists could not be acquired after the meeting because at that time, Mr. Jackson would be engaged in implementing the next major process of the Methodology and would not have time to consider the

contents of the lists. Therefore, the author would have to acquire the additional lists of alternative solutions before the meeting began. Then during the course of the meeting, after Mr. Jackson had generated his own list of alternative solutions, the author would present the additional lists of alternatives. Mr. Jackson could then add to his original list any solutions from the additional lists that he believed to be relevant to his purpose.

In acquiring the lists of alternative solutions, the author implemented step 4.2.2 with as many of the above people as possible. Step 4.2.2 was not implemented with Joe Rice or Scottie Torres because the author was unable to contact these two people. A telephone conversation rather than a direct person to person meeting was the method used to implement step 4.2.2. A telephone conversation was used because it was less time consuming. Step 4.2.2 was used rather than step 4.2.1 because the author believed that the wording of step 4.2.2 was more general and would therefore generate a wider range of alternative solutions. The author believed that Mr. Jackson would be benefited by a wider rather than a narrower list of alternative solutions. Step 4.2.2 was used rather than step 4.2.3 because the author believed that step 4.2.3 required activities that would be difficult to explain over the telephone. If the step was unintelligable to the person who was to generate the list of alternative solutions, two problems could arise. First, a very incomplete list might be generated. Second, no alternatives may be generated. In both cases, Mr. Jackson would be provided with fewer alternative solutions than may have been provided if a more comprehensable stimulus had been employed initially.

The list of alternative solutions that was acquired from Paul Cauette is as follows:

1. Core evaluation team.
   - evaluating the special needs of individual students.
   - prescribing an educational plan using the evaluation data.
   - preschool screening.
2. Inservice training for all levels from administrators to parents.
3. Secondary programs for emotionally disturbed.
4. Resource room concept.

Mr. Cauette made the following additional comments: "These priorities are that of the regional office and not of the State per se. I'm still waiting for Dr. Rice's priorities."

The list of alternative solutions that was acquired from Pete Dimures is as follows:

1. Development of a screening and identification procedure.
2. Developing a preschool evaluation procedure and a preschool program in general.
3. Core evaluation team.
4. Developing a program in junior and senior high school in all areas of special needs.

Mr. Dimures made the following additional comments: "These priorities depend to some extent on the region."

The list of alternative solutions that was acquired from Mike Moriarty is as follows:

1. Janet Owens is developing a five year plan and your program should be consistent with that plan.
2. Generic teachers to work with mildly involved kids or those who spend 75% of their time in regular classrooms.

3. Evaluation and assessment of individual children.
4. Preschool program.
5. Diagnostic prescriptive teacher model.
6. Resource room concept.
7. Consultant teacher model.

Mr. Moriarty also made the following comment about his seven previous responses: "Approaches four through seven are specific approaches to teacher training that we are considering."

Janet Owens provided the following list of alternative solutions:

1. Know the regulations for implementing 766.
2. Look at the requirements for certifying Special Education teachers.
3. Attend meetings that are held at the training institutions.
4. There are some specific priorities such as core evaluation teams, planning, and Special Education administrators.

In examining the above responses, the author realized that with the exception of the responses of Janet Owens, most of these responses were not alternative ways of identifying the State's priorities for implementing 766, but rather they were lists of what particular people believed the State's priorities to be. In other words, what most of these responses represented was results rather than means. If these responses were accurate, that is, if they were a valid listing of the State's priorities for implementing 766 rather than an individual's biased listing, then Mr. Jackson's problem would be solved. In which case Mr. Jackson would not need to develop and implement a strategy for identifying the State's priorities for implementing 766 because he would already have knowledge of what those priorities are. Given this possibility, it seemed logical that the author present the above responses to Mr. Jackson before he developed a

list of alternative solutions. Then if Mr. Jackson believed that the responses were an accurate listing of the State's priorities for implementing 766, he could consider this problem solved. At this point, he could move on to the next problem to which he would like to apply the Methodology. If Mr. Jackson believed that the responses were an inaccurate listing of the State's priorities for implementing 766, he could then develop a list of alternative identification strategies.

In reviewing these responses, Mr. Jackson looked for common items. He believed that if a particular item was in fact a State priority, then that item would appear on most of the lists. Mr. Jackson identified two such items. The common items were core evaluation teams and inservice training. He believed that these two items were the most accurate reflection of the State's priorities for implementing 766. He also believed that the other items on the list were useful pieces of information. He perceived the remaining items as guidelines specifying additional areas in which the Special Education Department could move in its assistance of area teachers in their implementation of 766. Because Mr. Jackson perceived certain items on the above lists as valid State priorities for implementing 766, he believed that this particular problem was solved.

Step 4.2.2 failed to accomplish its purpose in the sense that it identified priorities rather than generated alternative solutions. Three of the factors that could have caused this failure are: the step could have been faulty; or the step could have been adequate, but the author could have implemented it improperly; or the step could have been adequate, and the author could have implemented it correctly, but the person who was to respond to the step could have responded incorrectly due to some charac-

teristics of their personality, position, or environment. If the step were faulty, then there should have been some aspect of its wording that would have caused it to fail to accomplish its purpose. In examining step 4.2.2 the author did not identify any aspect of its wording that would have been a probable cause of the problem. To the author, the wording of step 4.2.2 seemed precise and comprehensible. If the author had implemented the step incorrectly, then the log of the activities that the author had engaged in during the course of this study would have revealed that at the time this step was being implemented, the author did not carry it out exactly as it was stated. In examining the log, the author found no such abberation; he had implemented the step exactly as stated. Thus, the cause of the problem was not to be found in the faulty implementation of an adequate step. This left the person who was responding to the step as the probable cause of the problem. In thinking about the persons for whom step 4.2.2 was implemented, the author realized that at the time of this study, each person was involved in establishing or had direct knowledge of State priorities for implementing 766. Given this fact, it seemed logical that when these persons were asked in effect how one could identify the State's priorities for implementing 766, they responded not with a list of alternative identification strategies but with a list of priorities because they were intimately aware of what these priorities were. This problem illustrates an important point; that point being that even when an adequate step is properly carried out, problems may still arise due to the idiosyncrasies of the persons for whom the step is being applied, and the unique characteristics of the decision making environment in which those people operate. There exists a gap in the Methodology to the extent that

these idiosyncrasies were not identified and planned for during the implementation of step 4.2.2. However, to the extent that these idiosyncrasies helped rather than hindered Mr. Jackson in his identification of the State's priorities, this gap is not critical because its existence did not prevent Mr. Jackson from solving a problem that was important to him. Identifying the idiosyncrasies of a client and their working environment is a very complex problem. So complex that the author believes that a separate methodology may be needed to solve it. The development of such a methodology is well beyond the scope of this study. However, it may be a relevant problem for future investigations. Until such a methodology is developed, the author believes that the solution used during this field test which was a combination of the experience of the author and the judgement of the decision maker will prove adequate should the problem arise in future applications.

At this point, Mr. Jackson turned his attention to the three remaining problems. In examining these problems, he decided to change their priorities. He also changed the resources allocated to each problem. The new priorities and allocations are:

1. Knowledge of priorities and availabilities of State funds--17 hours.
2. Knowledge of federal priorities for 766--15 hours.
3. Knowledge of priorities and availabilities of federal funds--12 hours.

At this point, Mr. Jackson decided to turn his attention to problem number one.

Results of Implementing Major Process 3.0: "Develop a Purpose Statement" for the Second Highest Priority Problem of the Decision Maker

3.0 Determine a statement of the purpose with respect to the problem area with which this application of the Methodology will deal.

3.1 Determine from the Resource Allocation Chart the time available for this step. All of step 3.0 must be accomplished within this amount of resources.

Since the resources allocated to this problem had changed the Resource Allocation Chart had to be modified. The new Resource Allocation Chart is as follows:

Figure 8

Revised Resource Allocation Chart for Problem #1

Process	%	Hours
State Purpose	2	.34
Alternative Solutions	10	1.70
Choose Solution	10	1.70
Operational Design	18	3.06
Implement Design	40	6.80
Evaluation	10	1.70
Unallocated Resources	10	1.70

3.2 If resources allow, the decision maker should do at least one of the following tasks to determine the nature of the problem area:

3.2.1 Read literature in the area.

3.2.2 Talk to people who work in the area.

3.2.3 Examine work being done in the area.

This step was not implemented due to inadequate resources.

3.3 The decision maker uses the results of this analysis (3.2) and the results of the definition of needs (the definition of needs page in the workbook) to help him/her state the purpose that he/she has in dealing with the problem area. The rest of this application of the Methodology will be designed around this statement of purpose in order to deal effectively with the problem, e.g., the decision maker might choose to meet the need that was rated most unmet.

The purpose that Mr. Jackson had in dealing with problem number one was to know the priorities and availabilities of State funds. Mr. Jackson believed that if this purpose were accomplished, the problem would be solved.

3.4 The decision maker tests the purpose against the following criteria:

- is it desirable?
- is it definable?
- is it practical?

3.5 The decision maker revises the purpose if necessary and recycles through 3.4.

Mr. Jackson believed that the above purpose was desirable, definable, and practical.

3.6 Once all the answers to the questions in 3.4 are yes, write the purpose in the workbook.

In implementing this step, the exact wording of the purpose was recorded in the appropriate section of the workbook.

Results of Implementing Major Process 4.0: "Generate Alternative Solutions" for the Second Highest Priority Problem of the Decision Maker

4.0 Develop alternative solutions.

4.1 Determine the amount of resources available for this step from the Resource Allocation Chart. All of step 4.0 must be accomplished within this amount of time.

According to the Resource Allocation Chart, there was 1.70 hours available for the implementation of this major process.

4.2 Determine solutions to the purpose.

4.2.1 Put down on a separate piece of paper all solutions

that you would label usual solutions. This includes solutions that you have tried in the past with a similar problem.

In implementing this step, Mr. Jackson identified the following alternative solutions to the problem of identifying priorities and availabilities of State funds.

1. To contact head of inservice training in Special Education.
2. Work closely with the Institute for Governmental Services.
3. Work with the dean of special programs in the School of Education.
4. Work with the business manager in the School of Education.
5. To utilize information received in solving problem one (identifying State priorities for 766) and work up a proposal and float it through different State funding agencies in order to get a reading on priorities and availabilities of funds.... to maker contact with State and regional funding agencies.

4.2.2 Put down all the ways that you can accomplish the purpose. You are looking for usual solutions to the problem.

In implementing this step, Mr. Jackson identified the following alternative solutions:

6. To conduct an institute on 766 and invite all State funding agencies associated with Special Education.
7. Explore the possibility of using some funds from the Department of Mental Health.

4.2.3 If resources allow, on a second piece of paper write out all the ways you could fail to accomplish the purpose.

The following are a list of ways in which Mr. Jackson believed that he could fail to identify the priorities and availabilities of State funds:

- Not familiarizing myself with regulations and change.
- Not engaging in necessary public relations to make key persons in the State aware of the Special Education Program at the University.
- No new resources.
- Extremely limited student enrollment.
- No meaningful master's or doctoral program.
- Extremely limited inservice component.
- No additional graduate admissions slots.

4.2.4 If step 4.2.3 was performed, look at the list of ways you could fail to accomplish the purpose and use this list to produce solutions to the purpose.

In implementing this step, Mr. Jackson simply negated the ways in which he could fail to accomplish his purpose. This resulted in another set of alternative solutions. The alternative solutions generated in this step are as follows:

8. To familiarize myself and my staff with all regulations and changes relative to 766.
9. To engage in necessary public relations (brochures, newspapers, radio, and T.V.) in order to sensitize key people in the State to the Special Education Program at the University.
10. Having additional resources.
11. Unlimited but selected enrollment.
12. Meaningful master's and doctoral programs.
13. Adequate inservice component.
14. Reasonable number of graduate admissions slots.

4.3 Producing a final list of alternatives.

4.3.1 Look at all lists and test for redundant solutions. Cross out all but one of the redundant solutions in each case of redundancy.

4.3.2 Enter in the workbook the list of alternative solutions.

In examining the list of alternative solutions, Mr. Jackson decided that solutions ten through fourteen were not ones that he believed would solve the problem. Therefore, these solutions were removed from the list. The solutions that were entered into the workbook were solutions one through nine.

At this point, the author realized that he and Mr. Jackson were running ahead of schedule. That is, the procedures of major process four had been completed earlier than expected. There was a surplus of about fifteen minutes of decision maker time. In discussing with Mr. Jackson

how these minutes might be used, he decided that he would like to devote them to generating additional alternative solutions. In order to satisfy Mr. Jackson's expressed desire, the author presented him with three stimuli that the author's experience had shown him to be helpful in aiding others to identify alternative ways of solving a particular problem. The first stimulus was:

> Imagine yourself actually identifying the priorities and availabilities of State funds. As you observe that situation, what are all the things that indicate to you that the priorities and availabilities of State funds are being identified.

In responding to this stimulus, Mr. Jackson identified the following alternative solution:

- Engaging in discussions with key persons in Boston--also Peter Edleman who is a significant other so far as funds are concerned.

The second stimulus presented to Mr. Jackson was:

> Think up alternatives to your alternative solutions.

The alternatives generated by this stimulus were:

- To consult with the Dean of the School of Education to get his perceptions of Special Education.
- Do the same thing with the Chancellor.
- Contact my Congressman.
- Contact Speaker of the House Bartly.

The final stimulus presented Mr. Jackson was:

> Think up alternatives that have nothing to do with accomplishing your purpose.

Two alternatives that Mr. Jackson believed had nothing to do with accomplishing the purpose were:

- Plan and attempt to implement graduate (master's and doctoral) programs in Special Education based on my own intuitive feelings.
- Make myself, program, and staff known to the Chancellor and subsequently to the University community as a whole.

The author then asked Mr. Jackson to review his responses to the above stimuli and consider if any of them might be alternative solutions. Mr. Jackson did not believe that any of the above responses could be considered alternative solutions. Therefore, no changes were made in the list of solutions that were entered in the workbook. At this point, the author proceeded to the next major process of the short form.

Results of Implementing Major Process 5.0: "Choose the Most Appropriate Alternative Solution" for the Second Highest Priority Problem of the Decision Maker

> 5.0 Choose a solution.
>
> 5.1 Determine the amount of resources available for this step from the Resource Allocation Chart. All of step 5.0 must be accomplished within this amount of time.

According to the Resource Allocation Chart, there was 1.70 hours of available time for implementing this step.

> 5.2 Operationalization of the purpose.
>
> 5.2.1 Imagine a hypothetical situation in which your purpose has just been accomplished. All the people, places, objects, etc., involved with the purpose are in this situation; this includes yourself. Look at this situation; observe it very carefully. On a separate piece of paper, put down all the events, actions, and verbalizations that tell you that your purpose has been accomplished.

The purpose of this step is to develop the criteria on which the most appropriate solution will be chosen. These criteria are to be developed by having the decision maker produce an operational definition of his/her purpose. Such a process maximizes the chances that the criteria will be valid for the decision maker because the criteria themselves are derived from the decision maker's definition of what he/she would like to do with respect to solving a particular problem. This step was especially productive. Thirteen selection criteria were gènerated. These criteria are:

1. Knowing exactly where to submit proposals for funding-amounts of money available, and the strengths and/or resources of our program to deliver the services.
2. R.F.P.'s to respond to.

3. Funded programs at different levels.
4. Adequate resources, people, and staff.
5. Viable delivery of service systems.
6. Less strained relationships with the Dean of the School of Education.
7. Variety of offerings in Special Education.
8. Additional components of programs, i.e., early childhood, institutional, blind/deaf, etc.
9. High visibility and good public relations.
10. More outreach, away from the University and the Commonwealth.
11. Adequate office and resource facility.
12. Adequate resource materials, research, and evaluation components.
13. Travel and consulting to other programs.

5.2.2 If resources allow, have other people do the above and use their input to make changes on your original list.

This step was not performed due to a lack of resources.

5.2.3 If resources allow and you have ever had a similar problem before, think up all the criteria that you used then to tell yourself that you had successfully accomplished this similar problem. Check your list to see that each of the criteria is on the list; for any criteria that are not on the list, add them to the list.

This step was not performed because Mr. Jackson could not identify a problem that was similar to the problem of identifying priorities and availabilities of State funds.

> 5.2.4 Check through the list and for each criteria, decide which are truly criteria for you--that is, if the criteria doesn't happen does that really tell you that your purpose has failed. Cross off any criteria that do not pass this test.

In examining the thirteen criteria that Mr. Jackson had generated in step 5.2.1, he decided that all the criteria were relevant; therefore, none were deleated.

> 5.2.5 Choose the six most important criteria on your list. That is, choose those criteria on this list that tell you more than any others that your purpose is accomplished. (If there are more than six, then don't stop at six but try to choose at least six.) Write the chosen criteria in the appropriate place in the workbook.

In implementing this step, Mr. Jackson decided that he wanted to review the alternative solutions in light of all thirteen criteria. Therefore, all thirteen were used in the selection process.

5.3 Choose appropriate solutions.

5.3.1 Estimating probabilities of the success of the alternative solutions, invent a short name for each alternative solution and enter it in the parentheses next to the description of the solution.

The following abbreviations were developed for the solutions:

MM for solution #1.

AE for solution #2.

DA for solution #3.

GL for solution #4.

PP for solution #5.

766 for solution #6.

RM for solution #7.

Reggie for solution #8.

Media for solution #9.

5.3.2 Take the first alternative solution on the list and look at it in relation to the criteria for accomplishing the purpose.

The selection process employed in the short form uses the following format; first, each alternative solution is examined against each criteria and then a decision is made as to whether or not the solution is likely to accomplish the criteria. Then a second examination is made.

The second examination involves assigning a numerical probability to the likeliness of each alternative satisfying each criteria. The probabilities range from .0 in the case where there is almost no chance of the alternative satisfying the criteria to 1.0 when there is a very good chance of the alternative satisfying the criteria.

This two part examination is done for each solution separately. Thus, in this particular application of the Methodology, the examination process was performed nine times, nine being the number of solutions being examined. The author believes that nine separate listings of the results of implementing these procedures would be unnecessarily long and highly repetitive. Therefore, in reporting the results of implementing the remaining procedures of major process five, the following format will be used. First, the procedures of the steps that were used will be listed and blocked out. Second, the results of the usage of these procedures will be presented in a single matrix. The matrix will contain the probabilities of each alternative meeting each criteria together with a summation of the probabilities of each alternative across all criteria and a ranking of the alternative solutions based on these summed probabilities. The author believes that this format will present the data on the usage of major process five in a manner that is concise and understandable.

5.3.3 For each of the criteria in your workbook, decide if the solution is likely to accomplish that criteria and put an "L" in the appropriate box in the matrix if it is likely to (that is, the chance is greater than 50% as you estimate it). Put an "N" in the appropriate box of the matrix if the solution is not likely to meet the criteria.

5.3.4 For each criteria for which there is an "L" under the solution, determine the probability that the solution will accomplish each of these criteria. Because you put an "L" in the box, these probabilities will be greater than or equal to .5. You must estimate how probable this is based on your perceptions of the solution.

5.3.5 For each criteria for which there is an "N" under the solution, determine the probability that the solution will accomplish this criteria. This probability should be less than or equal to .49.

5.3.6 Do this process for each of the solutions that you have put in the workbook. If your resources are short prioritize the rest of the solutions as to the ones you feel most likely to accomplish the purpose, then do the above process for the top three solutions in your priority order.

5.3.7 If resources allow, have other persons perform steps 5.3.2 to 5.3.6. Use their input to reconsider your choices and revise your probabilities if necessary.

Figure 9

Decision Maker's Estimation of the Probabilities of Success for a Series of Alternative Solutions

Alternative / Criteria	MM	AE	DA	GL	PP	766	RM	Reggie	Media
1	L 1.0	L 1.0	L .8	L .6	N .49	L .7	L .5	N .00	N .49
2	L 1.0	L 1.0	L .5	L .6	N .49	L .5	L .5	N .00	N .40
3	L 1.0	L .7	L .5	L .5	L .5	L .5	L .5	N .00	N .49
4	N .45	L .5	L .6	L .5	N .49	L .5	N .49	N .00	N .40
5	N .49	L .5	L .5	L .5	N .00	L .5	N .40	L .7	N .49
6	N .49	N .49	L .5	N .25	N .00	L .5	N .20	N .49	L .6
7	L .7	L .6	L .5	L .5	N .00	L .5	L .5	L .7	N .49
8	L .5	N .40	L .7	L .5	N .49	L .5	L .5	N .49	N .40
9	L .5	L .6	L .6	L .5	L .5	L .5	L .5	L .5	L 1.0
10	L .6	N .49	L .5	N .30	L .5	L .8	L .5	L .5	L .9
11	N .00	N .00	L .6	L 1.0	N .00	N .00	N .00	N .00	N .49
12	N .00	N .30	N .40	N .49	N .00	N .00	N .20	N .45	N .40
13	N .00	L .5	N .20	N .49	L .5	L .5	N .49	N .49	L .6
Average Probabilities	.52	.54	.53	.52	.30	.46	.41	.33	.55
Ranking	4	2	3	4	8	5	6	7	1

At this point, a major gap was discovered in the short form. Although major process five contained numerous procedures for estimating the probabilities of success for each alternative solution, there was no procedure for actually selecting the most appropriate solution. To fill this gap, the author designed the following step:

> 5.3.8 Examine the matrix and choose the solution that best meets the criteria.

This step was implemented during the field test. In implementing this step, an important problem was encountered. The problem was that Mr. Jackson decided that the solution that he would like to implement, the solution that he believed would best accomplish his purpose, was not the solution that had the highest combined probability. In explaining his decision, Mr. Jackson stated that the tenth criterion was the one that was most important and he had given two alternative solutions (766 and Media) almost the exact same probability of meeting that criterion. He then stated that his second most important criterion was criterion number one and on this criterion, the alternative abbreviated "Media" had been given a much lower probability than the alternative abbreviate "766." Thus, with respect to accomplishing the criteria that Mr. Jackson believed to be most important, the alternative solution which was abbreviated "766" was the most effective. It was on this fact that Mr. Jackson based his selection.

In considering this problem, the author first thought it was indicative of the fact that major process five had failed to accomplish its

purpose because what had happened was that the decision maker had chosen a solution that the Methodology's procedures had demonstrated not to be the most effective alternative with regards to meeting the full range of the decision maker's criteria. In examining this interpretation, the author found it to be inaccurate. Major process five had accomplished its purpose which was to select that solution that the decision maker believed would best accomplish his/her purpose. What had happened was that Mr. Jackson had used the data contained in the matrix to select the most appropriate solution. However, Mr. Jackson had not allowed the data to mandate the decision that was to be made. This fact made clear to the author how the data in the matrix are to be used. A decision maker's selection of the most appropriate solution should be based on the data contained in the matrix. That is, the data should be evaluated, interpreted, and used. However, the decision maker's selection of the most appropriate alternative should not be restricted by or controlled by the data. That is, the decision maker should select those pieces of data that he/she believes are most important and make a selection on the basis of these.

This problem reveals an important characteristic of the Methodology. The Methodology's intent is not to coerce the decision maker into choosing a certain alternative solution, but rather to assist the decision maker in selecting a solution to which he/she is committed. A decision maker needs to be given the option of interpreting the selection data from his/her own perspective. If this option is not provided, the decision maker may select a solution that is numerically correct but personally invalid.

This problem also indicates an important characteristic of the methodologist/decision maker relationship. Decision makers, especially competent decision makers, may provide useful insights regarding those points at which the Methodology could be improved. These insights could be the voicings of difficulties that the decision makers are experiencing during the implementation of specific steps, or these insights might take the form of recommendations as to how a defective procedure might be improved. A methodologist needs to be aware of the fact that Decision Making Methodology is not problem free and an implication of this awareness is that the methodologist be sensitive to the insights of the decision maker for whom the Methodology is being applied. In the case where these insights evidence the existence of a problem, the methodologist should direct some of his/her efforts to the design of new, more effective methodological procedures. A problem free Decision Making Methodology may be more effectively developed when client and methodologist work together in the identification and solution of critical methodological problems.

To solve this problem, the author revised step 5.3.8 to read:

5.3.8 Using the information contained in the matrix, select the solution you believe is most appropriate.

At this point, Mr. Jackson pointed out another gap in the short form of the Methodology. Before proceeding to the next major process in which the operational details of the institute would be worked out, Mr. Jackson wanted the feasibility of the institute examined by some relevant others. The short form of the Methodology had no procedures for offering the solution to other people for their analysis and critique. To fill this gap, the author added the following procedure.

5.3.9 If resources and desire permit have the solution confirmed with any other individuals or groups that the decision maker may choose on the basis of personal preference or on the basis of the laws and policies under which the decision maker operates.

Mr. Jackson wanted Ms. Scottie Torres to critique the feasibility of the solution. Ms. Torres was chosen because she had substantial background in the coordination of institutes such as the one Mr. Jackson was planning to carry out. Therefore, the author presented the solution to Ms. Torres for her comment and criticism. Ms. Torres' analysis was particularly complete. She commented on three areas: feasibility, content, and participants. With regard to feasibility, Ms. Torres firmly believed that the institute would help Mr. Jackson in outreach and in determining what types of funds are available for doing what types of things. Ms. Torres also commented that the institute would be especially helpful in these two areas if the institute was composed of prominent members of the School of Education and the State's funding establishment. With regards to content, Ms. Torres believed that the institute should:

- cover topics that are very valuable to the State Department people that you invite;
- be broader than a discussion of Mr. Jackson's program or the diagnostic prescriptive teacher model. This institute should represent the whole School of Education;
- stress the possibility of the School of Education interfacing with the State Department for the purpose of helping the State Department solve some of their most pressing problems;

- possibly include the following components: staff development, in-service education, training, program development, consulting, core evaluation teams, and parent involvement.

Ms. Torres then mentioned that ideas for the components of the institute might be gotten from:

- reading 766;
- looking over Ms. Torres' definition of Bob's needs for funding contacts;
- looking over what the author had obtained from Moriarity, Demures, etc.;
- looking over the conference that Ms. Torres has just finished running at the Lord Jeff.

Ms. Torres made the following comments regarding Mr. Jackson's role in the institute itself. "Your role in the institute should be very low key, although the funding people should come away with the idea that you are the Special Education contact person at the University. With respect to your role at the University, you should become an Art Eve. Just as his office is a conduit for the funnelling of federal funds to the rest of the University, so your office should be a conduit for the dispersal of Special Education funds to the rest of the University. Then your staff could act as a team of professional consultants to those folks using the funds. This is logical given the fact that there are much more funds available in the State for Special Education than your staff, given its present or projected size, could handle. One way the institute could run would be to have the University people present what they can do, followed by the State people presenting their agenda, concluding with the University and State people getting together and working out plans for one helping the other."

With regard to participants, Ms. Torres believed that the institute should be composed of:

- State funding people such as:

  Jack Burk

  Mike Moriarty

  Bill Ferris

  Jim Bradley

  Max Bogart

  Carolyn Scott

  Hank Owen

  Sue Solomon

  Scottie Torres

- School of Education folk such as:

  Bob Jackson

  Kathy McArdle

  Pam Milles

  Norma Jean Anderson

  Atron Gentry

  Dick Clark

  Dwight Allen

  Harvey Scribner and other people who push inservice education

- Others

  It might be good to pull in some federal people to show State people that D.C. is interested in what the University has.

Ms. Torres mentioned that she would be very willing to help Mr. Jackson plan the institute once he got an idea of what the theme would be and who will be coming. She also mentioned that she could help develop specific things for specific people.

Ms. Torres also had the following general comments regarding the institute:

- September is out.
- It has to be held at some dynamite place.
- What is presented must be of benefit to the State funding people.
- These people have been confrenced to death.
- Take about two days, three if it's unusually good.
- Small number of people.
- Contacting the LEA's may turn up ideas of what to present.
- The whole conference has to be classy. The conference that Scottie ran had flyers, place mats, plaques, a theme, a symbol, drink tickets, and name tags. The funding people should come away feeling good. They should have something to take home with them.
- The conference has to be very well planned.
- It has to be informal.
- A possible theme is what the University is and what it can grow to become.

Mr. Jackson found these comments very useful. They first of all convinced him that the running of an institute was a feasible way of accomplishing the most important components of his purpose which were knowing exactly where to submit proposals for funding and developing more outreach. Mr. Jackson also believed that these two components of his purpose would be accomplished if the institute included critical decision

makers from the University and the State Department. Mr. Jackson also viewed Ms. Torres' comments regarding participants and content as data that could be used in designing the specifics of the institute.

At this point, Mr. Jackson made two important changes in the work that remained to be done. The first change regarded resources. The second change regarded his role in the application of the Methodology. Mr. Jackson decided to devote all his remaining resources, which was a total of 40.26 hours to the design, implementation, and evaluation of the institute. The design of the institute was to consume 11.50 hours. The implementation of the institute was to consume 23.00 hours. The remaining 5.75 hours were to be devoted to the evaluation of the institute. The effectiveness of the institute could also be used as one source of data in an evaluation of the Methodology since the institute will have been designed and implemented through the use of the Methodology's procedures. This meant that from this point on, long form procedures were to be used starting with the sixth major process of the Methodology which was entitled, "Plan the Implementation of the Solution." In that major process, the operational activities of the solution are designed. This change is important in the sense that it indicates that from this point on, a more complex version of the Methodology is to be used. With regard to his role in the application of the Methodology, Mr. Jackson decided that he could no longer be as heavily involved as he had been in the past. This change in role was due to a drastic decrease in his available time. Due to the increasing complexities and responsibilities of his position at the University, Mr. Jackson had much less time available for the implementation of the Methodology. However, he still believed that identifying the priorities and availabilities of state funds was a very important

problem and that the best way to solve this problem was to conduct an institute. He wanted to see the institute carried out. He also wanted to play a significant part in that process. In considering this problem, the author proposed the idea of selecting a surrogate decision maker. The surrogate decision maker would represent Mr. Jackson in the performance of certain Methodological procedures. Mr. Jackson would select the surrogate. Mr. Jackson would also critique the surrogate's usage of the Methodology and provide corrective guidance if the data indicated that the surrogate was moving in directions that were incompatible with Mr. Jackson's basic intentions.

The author explained that the selection of a surrogate would allow Mr. Jackson to considerably decrease the amount of resources that he would have to devote to the Methodology since most of the Methodology's procedures would be performed by the surrogate. The author also explained that the selection of a surrogate would permit Mr. Jackson to play a major role in the development of the institute because he would be periodically critiquing and if necessary, redirecting the work of the surrogate. Considering these two facts, Mr. Jackson decided to select a surrogate decision maker. At the time of the field test, no formal procedures existed for the selection of a surrogate decision maker. In selecting the surrogate, the author simply asked Mr. Jackson who would he like to act in the capacity of surrogate. Mr. Jackson identified Ms. Jane Miller as a potential surrogate. Before the author began working with Ms. Miller, the points at which Mr. Jackson would review the work of Ms. Miller needed to be determined. These points were needed so that Mr. Jackson could evaluate the work of the surrogate and determine to

what extent the work of the surrogate was consistent with his basic intentions. The first major process of the long form of the Methodology in which Ms. Miller would be engaged was major process six. The procedures of this major process may be divided into three sections. In section one, the major elements of the solution are designed. In section two, the activities necessary to implement each major element are developed. This section also contains procedures for integrating all activities regarless of the element to which they belong into a single list of chronological activities. The final section includes procedures for the design of a feedback mechanism. This mechanism will provide the decision maker with evaluation data on the effectiveness of the solution as it is being implemented. In discussing with Mr. Jackson the points at which he would review the work of Ms. Miller, it was decided that he would first review the solution's major elements. Then, if he found no major problems in this list of elements, his next review would focus on the single list of activities that would be developed for implementing the solution. However, if he found major problems in the list of the solution's major elements, then he would review the activities for implementing each element rather than waiting until a single list of activities had been developed. It was not decided at what points during the design of the feedback mechanism Mr. Jackson would review the work of Ms. Miller. These review points were to be decided upon before that section of the sixth major process was implemented.

At the time that Ms. Miller was designated as a surrogate, Mr. Jackson had secured a major grant for the delivery of Special Education services to seven school districts in Western Massachusetts. Ms. Miller had been charged with conducting an institute that would identify the

training needs of these school districts. Mr. Jackson believed that the institute that he was interested in implementing, one that dealt primarily with the identification of priorities and availabilities of State funds, could be coordinated with the institute that Ms. Miller was administering.

Mr. Jackson arranged a brief introductory meeting between the author and Ms. Miller. A problem was identified during that meeting. Ms. Miller did not believe that the priorities and availabilities of State funds could be identified during an institute whose primary purpose was the identification of training needs. This indicated to the author that Mr. Jackson's purpose may not be accomplished by the institute that Ms. Miller was planning to implement. It seemed logical that before proceeding any further, this problem should be discussed with Mr. Jackson. Mr. Jackson agreed with Ms. Miller; the priorities of State funds would most likely not be identified during an institute on inservice training. Each institute would call for different participants. The funding institute would be composed of critical decision makers from the University and governmental communities. The training institute would be composed primarily of educators from local primary and secondary institutions.

At this point, Mr. Jackson had a number of options open to him. First, he could choose another surrogate. Second, he could have Ms. Miller conduct a second institute whose primary intent would be to identify the priorities and availabilities of State funds. Third, he could choose a solution other than the institute; and fourth he could choose a problem other than the identification of the priorities and availabilities of State funds.

The fourth option was rejected because the identification of State funds was still a critical problem. The third option was also rejected,

because Mr. Jackson still believed that the best way to identify State funds would be through an institute. The second option was not accepted because Mr. Jackson did not believe that Ms. Miller could coordinate a second institute given her present responsibilities at the University. The first option was the one chosen. Mr. Jackson would choose another surrogate. The surrogate chosen was Mr. John Williams. Mr. Williams was chosen because of his expertise in project management. At the time of the field test, Mr. Williams was managing a major project in the area of the delivery of inservice Special Education services. Mr. Jackson was the principal investigator on that project.

The sections of the Methodology that remained to be implemented were major processes six, seven, and eight. In major process six, the operational details of the solution are developed. In major process seven, the solution is implemented. In major process eight, the effectiveness of the solution is evaluated. Mr. Jackson decided that he would discuss with Mr. Williams the possibility of his acting as a surrogate decision maker. The results of that discussion was that at this time, Mr. Williams had no objection to assuming the role of surrogate. Mr. Williams also agreed to devote the same amount of resources to the application of the Methodology that Mr. Jackson had planned to devote. Therefore, the author proceeded to implement major process six with Mr. Williams.

Results of Implementing Major Process 6.0: "Plan the Implementation of the Solution" for the Second Highest Priority Problem of the Decision Maker

6.0 Plan the implementation of the solution.

6.1 Plan the implementation of this major process.

6.1.1 Compile the following information.

6.1.1.1 The amount of resources that are available to implement this major process.

There were 11.50 hours available for the implementation of this major process.

6.1.1.2 A brief description of the work that has already been done on the problem for which this major process is to be applied.

The problem being addressed was the identification of the priorities and availabilities of State funds. This description focused on the third, fourth, and fifth major processes of the short form as these major processes had been applied to this problem. This description treated the procedures used and the results obtained. Since Mr. Williams was becoming involved at a point well into the contracting period, the author decided that the above description should be expanded to include a brief discussion of all the work that has been done to date. This additional description discussed the process that was used to select the problems to which the Methodology was to be applied, the work that had been done on the problem of identifying State priorities for implementing 766, the author's interest in decision making, and Decision Making Methodology at a general level.

6.1.1.3 A brief description of the procedures that may be used to implement this major process and the resources that may be allocated to each.

This description was an outline of the three stages that a decision maker would go through in planning the implementation of the solution. The first stage involved the design of the major elements of the solution. The second stage involved the design of the activities necessary to carry out each element. The final stage involved the design of a mechanism that would provide the decision maker with feedback data on the effectiveness of the solution as it was being implemented. It seemed logical to assume that the greatest amount of resources would be used in the second stage of this major process. Therefore, 5.75 hours were devoted to that stage. The author then decided to divide the remaining resources equally among the first and third stages of this major process. Therefore, 2.87 hours were devoted to each stage.

6.1.1.4 A brief description of the major processes that remain to be implemented for this problem and how the results of this major process will be used in successive major processes.

This description had three components. First, the purpose and procedures of major process seven, "Implement the solution," were briefly discussed. Second, the purpose and procedures of major process eight, "Evaluation," were also briefly discussed. The third component described the relation between major process six and major process seven. This relationship was that the implementation of the solution was essentially the performance of the activities designed in this major process.

6.1.1.5 A brief description of the contingencies under which the implementation of this major process could be halted or modified.

At the time of implementation, a complete list of contingencies had not been developed. The contingencies discussed were changes in the amount of available resources, changes in the importance of the problem, dissatisfaction with the results, by products, or procedures of the Methodology and/or failure of Mr. Williams to properly perform the role of surrogate.

6.1.2 Arrange a meeting with the decision maker for the purpose of planning the implementation of this major process.

6.1.3 Meet with the decision maker and perform the following tasks:

6.1.3.1 Have the decision maker confirm his/her intention to continue working with the methodologist. If the commitment of this

decision maker has changed determine the problem. Once the problem has been identified, make a judgement as to whether or not it can be solved practically. If so, solve it. If not, stop work and inform the contract decision maker of the situation. The final resolution of the problem should be approved by the contract decision maker.

Mr. Williams was committed to working with the author on the problem of designing and implementing an institute on 766.

6.1.3.2 Have the decision maker confirm the amount of resources that are to be used in the implementation of this major process. If the planned amount of resources is inaccurate or impossible to provide have the decision maker correct it and then communicate this corrected amount of resources to the contract decision maker.

Eleven and a half hours had been allocated for the implementation of this major process. Mr. Williams confirmed his ability and willingness to devote this amount of time.

6.1.3.3 Present the decision maker with the brief description of the work that has already been done on the problem for which this major process is to be implemented. Check for the decision maker's understanding of the description. Answer as clearly and completely as possible any questions that the decision maker may have.

6.1.3.4 Present the decision maker with the brief description of the procedures that may be used to implement this major process and the resources that may be allocated to each. Check for the decision maker's understanding of the planned procedures. Answer as clearly and completely as possible any questions that the decision maker may have. Have the decision maker confirm or modify the resources that have been allocated to the planned procedures.

6.1.3.5 Present the decision maker with the brief description of the major processes that remain to be implemented with this particular problem and explain how the results of the

present major process will be used in successive major processes. Check to make sure that the decision maker understands these subsequent major processes and answer any critical questions that the decision maker may have.

6.1.3.6 Describe to the decision maker the contingencies under which the implementation of this major process could be halted or modified. Check for the decision maker's understanding of these contingencies and answer as completely and as clearly as possible any questions that the decision maker might have.

Mr. Williams had no questions regarding the work that had already been done. He also understood the three stages of this major process and the relationship of this major process to major processes seven and eight.

Mr. Williams understood that the terms of the contract would be altered if the importance of the problem changed or if the amount of available resources changed. He also was cogniscent of the fact that the terms of the contract would be changed if he or relevant others were seriously dissatisfied with the results, by products, or procedures of the Methodology. The final contingency discussed was Mr. Williams' proceeding in dir-

ections that were inconsistent with Mr. Jackson's basic intentions. In such case, Mr. Williams would not be properly performing the role of surrogate and therefore, the contract would have to be revised.

6.1.3.7 Determine the specific dates on which the decision maker will be available to implement this major process.

Mr. Williams was unable to identify specific dates of availability. What was decided was that the author would contact Mr. Williams at the beginning of each of the remaining weeks of the contracting period and at that time, Mr. Williams would identify specific meeting times during the week.

6.1.3.8 Choose the first/next date.

The first date on which the author was to work with Mr. Williams on the design of the details of the institute was in the middle of September, 1974.

6.1.3.9 Review the date to make sure that it does not conflict with any critical activities that the decision maker will be involved in at that time. If there is a conflict, determine if an alternative date can be decided upon for one of the conflicting

activities. If an alternative date cannot be found, then the contract decision maker should be involved in the resolution of the conflict.

6.1.3.10 Have the decision maker confirm the date, and if possible, set an alternative date.

Mr. Williams found no reason to believe that he would be unavailable for the September meeting and for this reason, no alternative date was established.

6.1.3.11 Develop the agenda to be followed with the decision maker on the chosen date. This agenda should include the methodological procedures to be used. The agenda should be as complete as possible given the available resources. The last two procedures on the agenda should provide for evaluation and redesign and for cycling the methodologist back to step 1.6.7 where he/she will choose the next piece of work to be done.

The agenda to be followed was to begin with major step 6.3, "Design the major elements of the solution." During the meeting, as many of the procedures of that step were to be implemented as possible. If the resources and desire of Mr. Williams permitted additional major steps of

this major process would be implemented. In evaluating the effectiveness of major step 6.3, the author would ask Mr. Williams if he believed that the major elements of the solution had been identified. If Mr. Williams responded positively, the author assumed that this major step was working correctly. If Mr. Williams believed that the major elements had not been designed, the author would assume that a problem existed in the procedures of major step 6.3. Redesign would be undertaken if the author believed the problem to be critical. There was no reason to cycle back to step 1.6.7, because the next piece of work to be done was already known. The next piece of work to be performed would be to apply the next major step of this major process for Mr. Williams.

6.1.3.12 Review the agenda.

In reviewing the agenda, the author examined the logic and completeness of major step 6.3. The author did not identify any gaps that he believed would cause critical problems during the implementation of the agenda.

6.1.3.13 Plan for providing feedback on the effectiveness of the agenda as it is being implemented.

The feedback mechanism used would be the author's noting of the ease or difficulty with which Mr. Williams performed each of the activities of major step 6.3. Mr. Williams was not to be asked his reaction to each

step after its implementation, because the author believed that such a process may cause Mr. Williams to spend too much time cognating about the steps rather than actually implementing them.

6.2 If the elements of the feasible solution have not been designed then proceed to the next step. If the elements of the feasible solution have been developed, proceed to step 6.7.

Since the major elements of the institute had not been designed, the author proceeded to step 6.3.

6.3 Design the major elements of the feasible solution.

6.3.1 Imagine and write down all the ways in which you could implement this solution, avoiding all problems.

In response to this stimulus, Mr. Williams identified the following items as major elements of the solution:

- Telling people what's available.
- Telling how the University might assist the community in implementing 766 and tap into State funds.
- Highlight the significant people such as Chuck Carpenter.
- Identify the people who would make 766 go.
- Have a trusting dialogue between the two.
- Talk to some University people such as Dick Clark.
- Involve significant State and local people in planning.
- Get the most significant State people involved.

- Develop a profile on school districts and help service agencies.
- Identify the top ten names in Special Education.
- Do a needs assessment.
- Develop trial balloons--this should be an ongoing process.

At this point, a problem was encountered. Mr. Williams mentioned that he did not believe that Mr. Jackson should be running an institute for the purpose of identifying additional sources of funds. This belief was based on two facts. First, at present, Mr. Williams was administering a very large grant under the direction of Mr. Jackson. This indicated to Mr. Williams that Mr. Jackson's needs for funding were to a large degree satisfied at least for the present time. Second, Mr. Williams believed that once funds have been distributed, the primary criterion on which additional funds are allocated is the proper management of the original monies. Mr. Williams believed that an institute should be run which is a spin off of the funded project already in operation. He also believed that the thrust of the institute should be helping local educators tap into State funds rather than how the University can acquire additional governmental monies. At this point, Mr. Williams was proceeding along lines that were inconsistent with Mr. Jackson's original intentions. When the author pointed this out to Mr. Williams, he agreed. It was then decided to hold a three way meeting between Mr. Williams, the author, and Mr. Jackson for the purpose of dealing with this problem.

During the course of that meeting, Mr. Williams stressed the fact that if the project that the Special Education Department was presently managing was not successful then the chances of acquiring additional funds would be seriously decreased. Mr. Jackson agreed. Mr. Williams also men-

tioned that a useful theme for the institute would be that of project management. During the institute, area educators could be shown how to acquire and effectively utilize State monies. Mr. Jackson then expressed the concern that if this were done, if area educators were shown how to manage projects themselves, the role of the University in funded projects might significantly decrease. What role would the University play if area educators could acquire the monies for providing Special Education services to their students? Mr. Williams commented that such an institute would actually increase the role of the University because while the overall design and management of funded projects could be taken on by area institutions, many of the professional skills necessary to provide Special Education services could at present only be found on the staff of the Special Education Department. Thus, the role of the University would be one of a consultant to area schools. In this role, the University would provide the professional skills needed by area educators, while the area educators would be providing the overall administrative and design skills. Mr. Jackson found no serious flaws in Mr. Williams' reasoning. Therefore, it was decided that the institute to be run would be one which was a spin off of the present project and would address itself to how local school districts can tie into State funds. Although the thrust of the institute had changed from one involving primarily State Department and University officials to one drawing its participants largely from local school districts with the University and State Department playing minor roles, Mr. Jackson did not believe that his original purpose needed to be altered. He believed that this new institute would accomplish the most important components of his purpose which were developing more outreach and knowing exactly where to

submit proposals for funding. At this point, the author began working with Mr. Williams to design the major elements of this new institute.

> 6.3 Design the major elements of the feasible solution.
>
> 6.3.1 Imagine and write down all the ways in which you could implement this solution, avoiding all problems.

In responding to this stimulus, Mr. Williams did not simply identify a list of elements but rather he provided the author with an organized prototype of the institute. He believed that the institute should take the form of a one day experience composed of two parts. The first part would stress project management. The second part would stress the acquisition of funds. The second part would address itself to two issues. First, it would discuss the problems and implications which 766 has for school administrators at the superintendent level. Second, it would discuss grantsmanship. With regards to grantsmanship, the second part of the institute would present what monies are available and how they might be acquired.

> 6.3.2 Imagine and write down in what ways you could fail to implement this solution.

In responding to this stimulus, Mr. Williams identified the following items:

- If the institute was not needed by the target population--if they could get the information provided in the institute from some other source.

- If the idea of the institute was not continually field tested.
- My own tunnel vision blinders.
- Failure to recognize our real enemies.
- Mechanics-site, location, time.
- If the panel were not composed of powerful and influential people.

6.3.3 Imagine the solution being implemented, write down what is happening.

6.3.4 Think up elements that have nothing to do with implementing the solution and consider whether they do or not.

These two stimuli failed to elicit additional items from Mr. Williams.

6.3.5 Create one list from all the lists generated in the previous steps. For the elements generated in step 6.3.2 change their statements so that they describe an element that could be used in the implementation of the solution.

Mr. Williams made no change in the original prototype developed in step 6.3.1. He did negate the items generated in step 6.3.2. However, he viewed these negated items as concepts that he should constantly consider as the institute was being designed rather than as major elements of the institute itself.

6.3.6 Test the completeness of your list of elements by performing any one or combination of the following activities:

6.3.6.1	Have others perform the previous steps. Examine their responses and decide if their lists of elements contain elements that you would like to add to your list. If there are such elements, add them to your list.

Mr. Williams identified two people that he believed could provide useful input. These people were Mr. Harold Hutchins, and Dr. George Selig. The author explained to Mr. Williams that in interacting with these people, the author would present them with as many of the previous stimuli as possible. Mr. Williams wanted four additional questions to be asked of each of these people prior to the presentation of the stimuli. These questions were:

Is the institute feasible?

What should it include?

Should it include the teaching of grantsmanship?

Should it include a description of the available funds?

Mr. Williams wanted these questions asked in the above order. The author believed that the second question would elicit much the same response as would the stimulus contained in step 6.3.1. The ways of implementing an institute can be viewed as potential components of the institute itself. Therefore, the author did not believe that the questions posed by Mr. Williams were inconsistent with the purpose of step 6.3.6 which was to obtain additional lists of solution elements. If time permitted, each of the above people would be asked to respond to the stimuli contained in steps 6.3.2 through 6.3.5.

The responses of Dr. Selig will be presented first. These responses were acquired over the telephone. The questions asked and the answers obtained were as follows:

1st question: Hello, my name is Tom Heffernan and I'm calling for Bob Jackson and John Williams from the University of Massachusetts School of Education, Special Education Department. Bob and John are thinking of running an institute which would be a spin off of project CIDD (which was the federal project that the Special Education Department was engaged in at the time this step was being carried out) and which would address itself to how local school districts can tie into State funds. Is such an institute feasible?

1st response: Yes, but not for us.

2nd question: For whom?

2nd response: For most (the majority) of the other districts.

3rd question: What should such an institute include?

3rd response:

1. Review of funding sources.
2. Review of noneducational sources of funds (other agencies).
3. Write behavioral objectives.
4. Meet grant writing needs of the districts (how to fill out forms).
5. Brainstorming ways of going at 766, most districts have limited imagination due to their limited experience in Special Education.
6. Stress development of delivery systems.

Additional stimuli were not presented to Dr. Selig because he was unable to talk further. The responses of Mr. Hutchins were:

1st question: Hello, my name is Tom Heffernan and I'm calling for Bob Jackson and John Williams from the University of Massachusetts School of Education, Special Education Department. Bob and John are thinking of running an institute which would be a spin off of project CIDD and which would address itself to how local school districts can tie into State funds. Is such an institute feasible?

1st response: Yes.

2nd question: What should such an institute include?

2nd response: Information on:

- What's available, what title it's under and what it applies to.
- State versus federal funds.
- Strings attached to acquiring seed money and reapplying for seed money.
- Red tape involved in getting and using seed money.
- What seed money can be used for by the person who gets it.
- How long funds are available.
- Who has to sign off on funds; such as LEA's and superintendents with or without the school committee.
- Outright and decreasing monies.
- Evaluation, accountability, evaluation teams, audits.

- Who can apply for funds other than school districts: for example, parent groups, community groups, and the Association For Retarded Children--and who signs off for these agencies.
- What the State won't fund, State and federal agencies won't fund projects that are already being provided by other agencies because they don't want to duplicate services. State and federal agencies also want projects to be on going; they want projects to be able to support themselves after initial funding.
- What is required under a particular type of money. The State title three funding guide can be used as an example.
- Filling out forms.
- Who has the final say, how much flexibility do you have to work outside the original grant as outlined in the guide book.
- Grantsmanship.
- How to write a narrative or rationale.
- Involvement of school committee and superintendent in writing grants; does a grants writer just touch bases with these people?
- Outline the process in a step by step procedure to be handed out.
- How to evaluate the programs.

Besides commenting on the information that the institute should present, Mr. Hutchins stated that the institute should include the following people:

- People concerned about money.
- Those who have influence on getting grants going.
- Those who are responsible for writing grants.
- Pupil Personnel/Special Education people (these persons are very important).
- Superintendents not so much.
- School committee members or officers, those who are influential in getting things a high priority.
- Principals who have a lot of power (who have a lot of Special Education kids).
- Parent representatives.
- ARC (Association for Retarded Children).
- Mental health people.
- Slew of agency people such as Goodwill, Sunshine Village, and Berkshire Unlimited.
- The staff (superintendent and assistant superintendent) of State institutions such as Belchertown.
- People from community based programs, such as store front schools. You can get a list of these programs from the Chamber of Commerce.
- People form the State Department of Special Education.
- Special educators and vocational educators.
- Area senators.
- People from within city and municipal governments.

- West Springfield Selectmen.

- Mayors.

3rd question: Should the institute teach grantsmanship?

3rd response: Grantsmanship should be taught by having people participate in activities related to grantsmanship.

4th question: Should the institute include a description of the available funds?

4th response: Yes, the book of titles can do that.

5th question: Could you briefly state in what ways the institute might fail to be effective?

5th response:
- If the wrong people were invited.
- If the timing was poor.
- If the objectives were not spelled out. The main objective of the institute should be how the information can be used. In advertising, you should say that the idea is not only to explore sources of monies but to begin to write grants.
- If there was no follow up.

Mr. Hutchins also commented that the Department of Mental Health had run a similar institute. It had been conducted on a regional basis and had included various State schools. He believed that Mr. Williams should look at the design of this institute in order to come up with additional ideas for the institute that he was planning to run. Mr. Hutchins also suggested that Mr. Williams contact Ms. Torres regarding the feasibility of the institute because Ms. Torres was closely involved with the State funding establishment and in that capacity could comment on the desirability of the institute to funding personnel.

Mr. Williams did not change his original list of elements in light of the responses made by Dr. Selig and Mr. Hutchins. However, he did believe that most of their responses represented issues that should be addressed during the design of the institute. Therefore, Mr. Williams decided to refer to these responses as the activities were being developed for carrying out each of the institute's major elements.

At this point, Mr. Williams decided to follow Mr. Hutchins' suggestion and discuss the feasibility of his original design with Ms. Torres. Mr. Williams wanted to know if Ms. Torres believed that an institute whose primary emphasis was the teaching of grantsmanship and project management and which was composed primarily of local educators with the University playing a less prominant, more facilitative type of role would be of interest to the LEA's and members of the State's funding establishment. Ms. Torres believed that such an institute would be of little interest to the State Department or the LEA's. In light of Ms. Torres' critique, Mr. Williams redesigned the institute along lines that he believed would be more beneficial to local school districts. He changed the focus of the institute from the teaching of grantsmanship and project management to counselling. He also changed the projected participants of the institute from superintendents, grants writers, and members of the State Department to principals and educators who were directly or indirectly involved in the problem of pupil personnel services.

Having made these changes, Mr. Williams communicated them to the author. To the author, it appeared as if Mr. Williams was proceeding in a direction inconsistent with Mr. Jackson's original purpose which was to identify the priorities and availabilities of State funds by conducting

an institute stressing project management and grantsmanship and which would be composed of University educators together with State and local funding personnel. The author asked Mr. Williams if he believed that this new institute would accomplish Mr. Jackson's original purpose. Mr. Williams did not think that it would. At this time, the author pointed out to Mr. Williams that he was proceeding in a direction that was inconsistent with Mr. Jackson's original intention and that before proceeding any further, these new changes would have to be confirmed by Mr. Jackson. Such confirmation was an agreed upon component of the relationship between the surrogate decision maker and the original decision maker. At this point, Mr. Williams made the following comments:

1. He had a number of other responsibilities that were of a higher priority than the design and implementation of the institute. These other priorities included his family, his dissertation, and his management of project CIDD. The result of having these other priorities was that at the present time, he was unable to devote the resources necessary to make the institute effective.
2. Regarding funding, he believed that it is more important to effectively manage project CIDD than it is to acquire or to learn from where to acquire additional monies. Project CIDD was the first major grant awarded to the Special Education Department and Mr. Williams was of the opinion that if this grant was poorly managed, the chances of acquiring additional funds would be seriously diminished.
3. He was not comfortable with the necessity of having his work confirmed and critiqued by Mr. Jackson.

4. He thought that the institute would be somewhat inconsistent with his personal values. Mr. Williams valued open relationships and he perceived an institute involving State funding personnel as developing into a somewhat less open somewhat "wheeler-dealer" type of enterprise.

Mr. Williams' comments added another dimension to the problem; namely that at this point, he was not capable of or committed to the running of the institute as it was originally conceptualized. The author decided that the seriousness of the problem necessitated a three way meeting between Mr. Williams, the author, and Mr. Jackson. The purpose of this meeting would be to discuss the nature of the problem and some of the available options. At this point, Mr. Williams suggested an alternative to the three way meeting. Mr. Williams proposed that he and Mr. Jackson meet separately and discuss the problem and the options. Then the author could meet with Mr. Jackson privately.

Mr. Williams requested a separate meeting with Mr. Jackson because he believed that he could best explain both the nature of his objections to the role of surrogate and the value of the institute he had conceptualized if the author were not present. The author had no objection to Mr. Williams and Mr. Jackson meeting privately; however, he did believe that he should discuss with Mr. Williams the available options prior to that meeting. Then during the course of the meeting, Mr. Williams could present the options to Mr. Jackson for his consideration. Then when the author met with Mr. Jackson, they could rediscuss the nature of the problem and the options. Thus, Mr. Jackson would have two opportunities to consider the problem and the options. One in which he and Mr.

Williams examined the problem and the options. The other in which he and the author examined the problem and the options. The second examination was needed so that the author would have first hand evidence of Mr. Jackson's understanding of the problem and the options. Some of the options available to Mr. Jackson at this time were:

1. Confirm the new design of the institute proposed by Mr. Williams.
2. Reject the new design and return to the original design. This option would most likely involve selecting a new surrogate, since Mr. Williams had indicated that he was no longer committed to the original design.
3. Choose a different solution other than the institute for identifying the priorities and availabilities of State funds.
4. Choose a different problem other than the identification of the priorities and availabilities of State funds. This option could also involve choosing a whole new problem area.
5. Terminate the application of the Methodology.

In discussing these options with Mr. Williams, the author stressed that the option to be followed should not be chosen on the basis of benefit to the author. The overriding purpose of Decision Making Methodology is to make decisions that are optimal with respect to the desires of the decision maker. This purpose implies that when faced with a series of options as to how to solve a problem that has arisen during an application of the Methodology, the fundamental criterion on which the selection is made should be benefit to the client or decision maker rather than benefit to the applier of the Methodology.

Mr. Williams met with Mr. Jackson and discussed the nature of the problem and the five available options. The author then met with Mr. Jackson to review and discuss his decision as to the option to be followed. Mr. Jackson had decided to persue the fourth option. He concurred with Mr. Williams in his observation that the successful management of project CIDD was of higher priority than the securing of additional monies. He also acknowledged Mr. Williams' inability to devote any substantial amount of time to the design and implementation of the institute. The new problem to which the Methodology was to be applied was the management of project CIDD. With regards to solving this problem, Mr. Jackson decided that Mr. Williams was to act as primary decision maker and not as surrogate decision maker. That is in solving the problem, Mr. Williams would not have to have his work critiqued and confirmed by Mr. Jackson. Mr. Williams would be given full responsibility for solving this problem.

At this point, the author decided to terminate the field test. This did not mean that the author would not work with Mr. Williams on the management of project CIDD, but rather it meant that the results of the application of the Methodology to that problem would not be recorded in this document. The author based his decision on the amount of data that had already been generated on the effectiveness of the Methodology. These data have been presented in this Chapter and in the one immediately preceding it. In the preceding Chapter, the logic of the long form of Decision Making Methodology was examined. In this Chapter, the practicality of certain sections of the long form and certain sections of the short form has been presented. Many of the methodological procedures that

would be applied to the management of project CIDD have already been discussed in this Chapter. If the results of applying the Methodology to the management of project CIDD were presented here, these procedures would have been tested a second time. The field test was set up to apply Decision Making Methodology for Dr. Jackson. Since he is no longer involved as decision maker, this field test is concluded. For these reasons, the field test was terminated at this point.

The Surrogate Decision Maker Problem

The most significant problem encountered during the course of the field test was the selection of a surrogate decision maker. Two surrogates had been selected and neither had performed the surrogate role effectively. Ms. Jane Miller was the first surrogate chosen. She did not prove to be an effective surrogate because she had a different intention for the institute that Mr. Jackson was intent on running. Mr. John Williams was the second surrogate chosen. He did not prove to be an effective surrogate for a number of reasons. First of all, he was unable to devote to the running of the institute an amount of resources equivalent to the amount that Mr. Jackson had intended to devote. Second, he did not believe that the Special Education Department should be attempting to acquire additional funds at this point in its development. Finally, he was uncomfortable with the surrogate role in general.

The lack of a systematic set of procedures for choosing a surrogate decision maker represents a critical gap in the Methodology. To fill this gap, the author has added to the Methodology a new section whose purpose is to choose a surrogate decision maker. The procedures of this

section address themselves to the problems encountered during the field test with regards to selecting a surrogate decision maker. These procedures provide for making an initial selection of a surrogate, determining the probability of the surrogate performing the surrogate role effectively, gathering and providing to the surrogate the information that may be needed to perform the surrogate role, and finally for developing a plan for working with the surrogate in terms of time and confirming this plan with the decision maker. The recommended process for selecting a surrogate decision maker appears below.

Process for Selecting A Surrogate Decision Maker

1. Explain the nature of the surrogate role to the decision maker.
2. Have the decision maker make an initial selection of a surrogate using one of the following two methods:
    - 2.1 Simple method:
        - 2.1.1 Have the decision maker identify other individuals or groups that he/she believes would respond to the Methodology's procedures in exactly the same way as the decision maker would.
        - 2.1.2 If more than one potential surrogate has been identified, have the decision maker choose the one that he/she believes will respond with the greatest similarity.
    - 2.2 Complex method:
        - 2.2.1 Have the decision maker identify his/her values.
        - 2.2.2 Have the decision maker choose the most critical of his/her values.

2.2.3 Have the decision maker identify those who hold the same values.

2.2.4 If more than one potential surrogate has been identified, have the decision maker choose the one that he/she believes holds the value the strongest.

3. Determine the probability of the surrogate performing the surrogate role effectively.

3.1 Have the decision maker answer the following questions with respect to the surrogate.

3.1.1 Will the surrogate be comfortable with the surrogate role? If the decision maker believes that the surrogate will be very uncomfortable with the surrogate role, then the decision maker should recycle to 2. and choose another surrogate.

3.1.2 Will the surrogate be able to devote to the Methodology an amount of resources equivalent to the amount that the decision maker has planned on devoting to the remaining appropriate sections of the Methodology? If the decision maker believes that the surrogate will be unable to devote an equivalent amount of resources then the decision maker should recycle to 2. and choose another surrogate.

3.1.3 Will the surrogate be comfortable with the Methodology? If the decision maker believes that the surrogate will be very uncomfortable with the Methodology then the decision maker should recycle to 2. and choose another surrogate.

3.2 Determine the probability of the surrogate performing his/her role successfully.

3.2.1 Select some step of the Methodology that has already been performed by the decision maker.

3.2.2 Arrange a meeting with the surrogate.

3.2.3 Meet with the surrogate and perform the following tasks:

3.2.3.1 Explain the Methodology and determine the surrogate's degree of commitment to it. If the surrogate appears to be uncommitted, inform the decision maker and select a new surrogate.

3.2.3.2 Explain the role of the surrogate to the surrogate and determine the degree of commitment of the surrogate to his/her role. If the surrogate appears to be uncommitted, inform the decision maker and select a new surrogate.

3.2.3.3 Explain the amount of resources required of the surrogate. If the surrogate is unable or unwilling to devote this amount of resources, inform the decision maker and select a new surrogate.

3.2.3.4 Have the surrogate perform the chosen step of the Methodology.

3.2.3.5 Present the results to the decision maker asking him/her to determine the degree of similarity.

3.2.3.6 Ask the decision maker to determine if there is enough similarity to warrent transference.

3.2.3.7 If the decision maker is absolutely sure that the surrogate will respond to the Methodology's procedures in the same way that the decision maker would, proceed to the next step. If not, either:

3.2.3.7.1 Have the surrogate perform additional steps of the Methodology and perform the last three steps for the results obtained.

3.2.3.7.2 Recycle to 2. and identify other surrogates.

4. Collect the information necessary for the surrogate to perform the surrogate role.

4.1 Using any one of the following methods, determine the information that the surrogate needs.

4.1.1 Ask the decision maker.

4.1.2 Ask the surrogate.

4.1.3 Ask others who may have worked with the decision maker on the problem to date.

4.2 Gather the necessary information.

4.3 Determine with the decision maker the points at which the work of the surrogate is to be reviewed.

4.4 If the resources permit, review with the decision maker the options that are open to the decision maker, should problems arise with the surrogate.

5. Provide the surrogate with the information.

5.1 Present the information gathered in 4.2 offering to answer any questions that the surrogate might have.

5.2 Explain to the surrogate the points at which the decision maker will review the work of the surrogate.

6. Develop a plan for interacting with the surrogate in terms of time.

7. Confirm the plan with the decision maker and the contract decision maker.

8. Implement the plan.

This concludes the second of the two Chapters devoted to the reporting of the results of the study. There are contained throughout this Chapter and the one immediately preceding it, new methodological procedures that have been designed in response to conceptual and/or practical problems identified in the long form of Decision Making Methodology. These new procedures, together with the existing procedures of the long form of Decision Making Methodology in which the author found no serious deficiencies were used to draft a new version of the long form of the Methodology. This new version, Version IV, is presented in Appendix Six. Chapter Six, the final Chapter of this document, presents a summary of the results of the study, states and discusses the conclusions that can be drawn from these results, and discusses some of

CHAPTER VI

SUMMARY OF RESULTS, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Overview of the Chapter

The purpose of this chapter is threefold. The first purpose is to summarize the results of the study in terms of the major differences between Version III and Version IV of Decision Making Methodology. The second purpose is to state and discuss the conclusions that the author believes can be drawn from the results of the study. The third purpose is to present the author's recommendations on some of the types of research that can be performed on Version IV of Decision Making Methodology. This chapter contains three sections, each of which deals with one of the above purposes. Before discussing the results of the study, a brief restatement of the problem addressed and the procedures used to solve this problem will be presented.

The problem of this study was to submit Version III of Decision Making Methodology to its first controlled analysis. This study was carried out in two phases. In Phase I, the logic of Decision Making Methodology was examined. Serious gaps in the Methodology's logic were filled through the design of new procedures. The process used to design new procedures was developed by Thomann and Hutchinson (1974). In Phase II, the procedures of Decision Making Methodology were field tested in an uncomplicated situation. Procedures that did not work well and which were critical to the Methodology accomplishing its

purpose were either replaced or redesigned. The process used to make procedural changes in Phase II was the same process used in Phase I. This study has produced a new version of the Methodology. This new version has been numbered Version IV. Version IV consists of those procedures that were designed during the course of this study together with the existing procedures of Version III in which the author identified no serious deficiency. What follows in section one is a concise comparison of Versions III and IV of Decision Making Methodology.

Both versions are identical in the sense that each contains the same eight major processes. However, the versions differ greatly with respect to the major steps that have been developed for implementing each major process. Section one will briefly describe the substance of and reasons for these differences. In this section, each of Decision Making Methodology's eight major processes are examined. This examination contrasts the documentation of a specific major process as it is presented in Version III with the documentation of the major process found in Version IV.

Summary of Results

Major Process I: Prepare for the Utilization of the Methodology

In both versions, this major process consists of the same six major steps. These steps are:

1.1 Determine the reader's frame of reference

1.2 Develop a current version of the Methodology

1.3 Disseminate the Methodology

1.4 Prepare the methodologist

1.5 Negotiate the decision making contract

1.6 Plan the implementation of the Methodology.

In this major process, the major difference between Version III and Version IV can be found in step 1.6. The procedures of step 1.6 documented in Version III were found to be impractical. They require the methodologist to develop a complete list of activities specifying all the procedures that are to be carried out for each decision maker for whom the Methodology is to be applied. The development of such a list would consume a tremendous amount of resources.

Version IV contains more practical planning procedures. The procedures of Version IV do not require the development of a complete list of activities for implementing the Methodology. Version IV provides a two part planning mechanism. The first part is to be carried out prior to the implementation of the Methodology. The second part is to be carried out as the Methodology is being implemented. In the first part, a timetable is developed for applying the Methodology for a particular decision maker. This timetable specifies when each major process is to be applied for each of the problems that the decision maker is interested in solving. This timetable does not list the procedures to be used in implementing the various major processes. These procedures are decided upon in the first step of the major process being implemented. In each major process, the first step is a planning step. Taken collectively, these planning steps compose the second part of the overall planning mechanism provided in Version IV. Thus, Version IV provides more practical planning procedures by dividing the planning

task into two separate components, one of which can be done prior to implementation, and the other which can be done during implementation.

Major Process II:
Perform a Needs Analysis

The above major process is more complete in Version IV than it was in Version III. In both versions, this major process consists of the same seven major steps. However, in Version IV, specific sub-steps have been added for the implementation of each major step. These sub-steps are not entirely original. In many cases, they were already developed procedures that had been contained in the Coffing/Hutchinson Needs Analysis Methodology (Coffing, Hodson, Hutchinson, 1973). Specific procedures were extracted from the Needs Analysis Methodology and integrated into this major process of Decision Making Methodology.

Major Process III:
Develop a Statement of the Purpose that the
Decision Maker has for Solving a Particular Problem

There are only minor differences in the above major process as it is documented in Version III and in Version IV.

Major Process IV:
Conceptualize the Ideal Solution

There are two main differences in the above major process as it is documented in Versions III and IV. The first difference is in the procedures used to develop a list of alternative ideal solutions. In Version III, the procedures used to develop a list of alternative ideal solutions required a decision maker to first define the term

ideal solution and then to generate a list of solutions that were consistent with that definition. In examining the logic of these procedures, the author realized that most decision makers have a similar definition of the term ideal solution. Most decision makers define an ideal solution as one which has been developed for a situation in which there are unlimited resources. Version IV makes use of this by having a decision maker develop a list of alternative ideal solutions by imagining how he/she might solve a given problem in a situation in which there were unlimited resources.

The second difference is in the procedures used to select the most appropriate ideal solution. Field testing was the only mechanism provided in Version III for the selection of the most appropriate ideal solution. In many cases, field testing would be impractical because it would require a great deal of resources to actually implement a set of alternative ideal solutions. Therefore, Version IV provides the decision maker with four separate selection techniques, each of which is designed to be used in different resource situations. These selection techniques are: estimation of the probability of success for each of the alternative ideal solutions, modelling, simulation and field testing.

Major Process V:
Design the Actual Solution

One of the first steps in the design of the actual solution is the development of a list of alternative feasible solutions. These solutions are called feasible because unlike the ideal solution, they are to be implemented in a limited rather than an unlimited resource

situation. The resources available for the implementation of a feasible solution are the resources that are actually available to the decision maker. The actual or feasible solution should be as similar to the ideal solution as possible. Minor revisions were made in major process five so that the ideal solution as it had been developed in the previous major process could be more effectively used as a template for the design of alternative feasible solutions. However, there was one major revision made in this major process. As was the case with major process four, the draft of major process five, contained in Version III, provided only one technique for the selection of the most appropriate feasible solution from among a list of alternative feasible solutions. Therefore, a change similar to the one made in major process four was also made in major process five; that is, a variety of selection techniques were provided.

Major Process VI:
Plan the Implementation of the Solution

There are three differences between the sixth major process as it is documented in Versions III and IV. These differences concern the design of elements, the design of a feedback mechanism, and the review of activities. The sixth major process of Version III provides only for the design of activities while the sixth major process of Version IV provides for the design of both elements and activities, depending upon the degree to which the feasible solution has been developed in the previous step. In the sixth major process of Version III, a set of procedures is provided for developing a feedback mechanism.

However, on analyzing the clarity of these procedures, the author found them to be very confusing. In the sixth major process of Version IV, there are a set of procedures that more clearly describe the procedures that the methodologist should implement in order to develop a feedback mechanism. In Version IV, a more complete reviewing of the activities of the solution is provided. In addition to reviewing the activities to see if they are operational, complete, logically coherent, and within the capability, knowledge and skill of the person expected to perform them, Version IV provides that the decision maker answer the following questions with respect to the activities:

--Will the activities have any serious negative effects on other people?

Ideally, the solution should have no negative consequences on any person, place or thing.

--Are the activities necessary?

The activities will be unnecessary if it is highly probable that some random event will accomplish the purpose of the activity.

--Will serious problems arise during the implementation of the activity?

Unless implementation problems are identified, they will be very difficult to solve, and it is advisable to identify and solve serious problems before they arise.

In asking and answering these questions, steps are taken towards assuring a problem free implementation of the solution's activities.

Major Process VII:
Implement the Solution

Version III provides only three procedures for the implementation of the solution. These procedures do not clearly differentiate the roles of the decision maker and the methodologist with respect to the implementation of the solution. In Version IV, these roles are differentiated. In Version IV, the decision maker is responsible for implementing or supervising the implementation of the solution while the methodologist is responsible for implementing the feedback mechanism. Version IV also provides a series of procedures by which the methodologist can aid the decision maker in using feedback data for the purpose of making corrective changes in the solution.

Major Process VIII:
Evaluate

The only significant change made in this major process refers to the procedures used to gather evaluation data. Evaluation data are to be gathered on each component of the decision maker's purpose. The solution will be judged effective if it accomplishes, to the decision maker's satisfaction, those components of the purpose that the decision maker believes are most important. In Version III, the only evaluation data to be used were those which had been gathered by the methodologist and provided the decision maker during the implementation of the solution. These data refer to the effectiveness of specific solution activities. These data do not necessarily refer to whether or not the decision maker's purpose has been accomplished. If these data do not refer to whether or not the decision maker's

purpose has been accomplished, they can not be used to evaluate the effectiveness of the solution. In this case, the decision maker will have to look to other data sources. In Version IV, additional data gathering procedures are provided.

Before discussing the conclusions of the study, some general observations should be discussed. These observations relate to the resources used during the course of the field test and to some of the changes which the Methodology may cause in the decision maker for whom the Methodology is being applied.

Time was the primary resource used during the course of the field test. It may be argued that the results of the field test were controlled in part by the amount of time allocated to the field test. According to this argument, greater amounts of time would cause greater amounts of data to be produced. This argument is an incomplete analysis of the relationship between the resource of time and the results of the field test. This argument is incomplete because it only discusses time from the perspective of amount. There are at least two other perspectives from which the resource of time may be viewed. The first perspective is span of time. The second perspective is the nature of the person providing the time. With regards to span of time, a given amount of time may be more effectively utilized if it is spread out over a reasonably long period. If forced to consume large amounts of time in short periods or spans, a decision maker may very easily become tense, frustrated and defensive. Blocks to creativity may also be established because the pressure to finish may be more intense than the desire to be original.

The span of time also influences the amount of the Methodology that can be implemented. Some sections of the Methodology provide for

acquiring information from sources other than the decision maker. Resources will be consumed in the acquisition of this information. Time, material and possibly money will be needed to design and implement an information gathering strategy. Resources will also be needed to organize and report this information once it has been collected. If the Methodology is to be implemented in a very short span of time, many of these information gathering strategies may have to be bypassed.

The nature of the person providing the time is also an important factor to consider when analyzing the relationship between the results of the field test and the resource of time. People are different. Some decision makers can produce more data in a given amount of time than can others. Thus, the amount of data produced during the field test is directly related to the intuition and creativity of the decision makers for whom the Methodology was being applied. The same factor should hold true for other situations in which the Methodology would be applied. Thus, when considering how productive the Methodology will be, the creativity of the decision maker must be taken into acount.

The long form of Decision Making Methodology is a very complex and comprehensive set of decision making procedures. If a decision maker had carried out each procedure of the long form, that decision maker would have been in contact with the Methodology for a considerable length of time. It is illogical to assume that such a contact would leave the decision maker totally unchanged. A substantial contact with the Methodology may change the decision maker in a number of ways. One such way relates to the decision maker's understanding of him/herself. In applying the Methodology, the decision maker addresses him/herself to problems that are of concern to the decision maker from within a given problem

area. If a decision maker examines the results of his/her analysis of these problems, certain patterns, preferences or inclinations may become apparent. These discoveries may form the fabric of personal insight and understanding.

The Methodology also provides for another type of insight. This second insight refers to the decision maker's understanding of his/her problem. There are certain sections of the Methodology in which others provide the decision maker with their analyses of the decision maker's problem. This analyses could include the other person's list of alternative solutions or the other person's list of what that person believes should be the major elements of the solution to be implemented. The others from whom these analyses are acquired are identified by the decision maker. However, the decision maker is usually unaware of what these analyses will include. In some cases, these analyses will be composed of unexpected information. This information may be so surprising that it may cause the decision maker to move in a new direction. Such a move is illustrative of the decision maker gaining a new insight into his/her problem. Thus, the Methodology may not only cause greater personal insights on the part of the decision maker but it may also prompt a more comprehensive understanding of the decision maker's problem.

Another way in which the Methodology may change the decision maker is by causing the decision maker to be more systematic in his/her decision making. This may happen as a result of the decision maker having come in contact with Decision Making Methodology, which is a systematic decision making process. Stated another way, after a substantial successful contact with the Methodology, the decision maker may internalize certain sections of the Methodology and then generalize those sections to problem

areas other than the one in which the Methodology was initially utilized. In this sense, the Methodology will have changed the normal process by which the decision maker makes decisions.

One more observation on the application of the Methodology needs to be made at this time. As has been mentioned, there was one point during the field test at which Mr. Jackson decided that he was no longer able to devote to the field test the amount of resources that he had planned to devote. However, he still wanted to be involved in some meaningful way. This situation arose because a new problem had arisen which was more important to Mr. Jackson than the problem that was being addressed during the field test. To resolve this conflict, a surrogate decision maker was chosen. At this point, the role of Mr. Jackson became one of confirming and if necessary, redirecting the work of the surrogate. This arrangement still allowed Mr. Jackson to be involved in the application. The surrogate strategy was also consistent with the purpose of the study which was to field test the Methodology. This consistency existed because the surrogate strategy permitted the testing of procedures that had not been tested. Thus, the surrogate strategy was advantageous to both the author and Mr. Jackson. However, had field testing not been involved, a different strategy would have been proposed and possibly carried out. This alternative strategy would have been to give Mr. Jackson the option of having the Methodology applied to the new problem. This strategy was not proposed because it would have meant reapplying the Methodology starting with its initial procedures and since these procedures had already been field tested, such a course of action would be inconsistent with the purpose of the study.

Conclusions That Can Be Drawn From the Data Produced

Two types of data were gathered during the course of the study. The first type refers to the coherence, clarity and completeness of the procedures of Version III of Decision Making Methodology. These data were presented in Chapter Four. That chapter contained the results of the author's logical analysis of the Methodology. That chapter also contained any new procedures that the author developed during the course of the logical analysis. The second type of data refers to the degree to which Decision Making Methodology accomplishes its purpose when the Methodology is actually applied. These data were presented in Chapter Five. That chapter contained the results of field testing the Methodology in an uncomplicated situation. That chapter also contained any new procedures that were developed during the course of the field test.

The conclusions that can be drawn from these data are as follows:

1. Version III of Decision Making Methodology accomplished its purpose when the Methodology was applied in a specific uncomplicated situation.

During the field testing phase of this study, Decision Making Methodology was applied to the following problems:

A. The identification of State priorities for implementing Chapter 766.

B. The identification of federal priorities for implementing Chapter 766.

C. The identification of priorities and availabilities of State funds in the area of special education.

D. The identification of priorities and availabilities of federal funds in the area of special education.

The first problem was solved through the use of the Methodology. The second problem was solved through other activities that the decision maker became involved in during the field test. Difficulties encountered during the course of the field test did not permit the Methodology to be applied to the third and fourth problems. These difficulties have already been explained in Chapter Five. The fact that Decision Making Methodology enabled the decision maker to identify the State's priorities for implementing Chapter 766 is data that the author had interpreted to mean that Decision Making Methodology accomplished its purpose when it was applied in this particular situation. These data do not and cannot be taken to mean that Decision Making Methodology will accomplish its purpose in any other situations. This can only be determined through additional testing.

2. Decision Making Methodology is not fully developed.

Version III of Decision Making Methodology was analyzed, field tested, and revised during the course of this study. This process produced a large amount of data on the effectiveness and logical coherence of Version III. These data were used to draft Version IV. Version IV is more complete than Versions I through III. However, Version IV is not absolutely complete. A great deal of developmental work still remains to be done. Further development needs to be done so that Decision Making Methodology will be capable of dealing with the full range of decision making situations. The Methodology will be fully developed when

a version has been produced which can be successfully implemented with only minor problems in a wide range of decision making situations. The purpose of further development is to produce a version of the Methodology that does not need substantial modification before, during or after a given application. Although the initial versions of the Methodology will most likely need to be further developed, the final version of the Methodology will not need additional development but will only need to be adapted to specific applications. The author believes that Version IV will be more effective than Versions I through III. However, this belief is not based on empirical evidence. Thus, in addition to the developmental work that remains to be done, a significant amount of testing remains to be carried out. Some of the types of research that could be performed in the immediate future are discussed in the final section of this chapter.

Recommendations for Further Research

Methodological research can take a number of forms. The research can be developmental; that is, needed procedures can be designed and integrated into the Methodology. The research could also be decision oriented. Such research consists of applying the Methodology in a controlled fashion for the purpose of evaluating its effectiveness. The research could also be conclusion oriented. Conclusion oriented research consists of testing propositions about the Methodology. Conclusion oriented research should only be undertaken when the Methodology or a particular section of the Methodology is found to be problem free.

Conclusion oriented research is only warranted when developmental research has produced an absolutely complete Methodology which decision oriented research has shown to be completely effective.

Decision Making Methodology is not problem free in the sense of being absolutely complete and fully field tested. Therefore, conclusion oriented research would not be timely. However, developmental research, the design of needed procedures and decision oriented research, the testing of new and/or existing procedures are recommended. Some of the sections of the Methodology for which additional procedures need to be developed are as follows:

1. Steps 4.3 and 5.10. Step 4.3 provides for the selection of the most appropriate ideal solution. Step 5.10 provides for the selection of the most appropriate feasible solution. Some of the selection techniques used in each step need to be more fully developed. Specifically, the techniques of modelling and simulation need to have a more complete set of activities developed for their implementation.

2. Step 3.4. Through the application of this step, the decision maker examines what is presently known about solving a particular problem. This step is critical since it aides the decision maker in conceptualizing that general type of solution that he/she believes will best solve the problem. For many problems, a staggering amount and diversity of information may be available. However, not every piece of information will have equal utility. This step needs to be developed to the point where a Methodologist can identify and acquire with

minimal difficulty those pieces of information that the decision maker believes are most relevant to the problem being presently analyzed.

3. Step 1.1. In its present form, the author does not believe that this step accomplishes its purpose which is to provide a person who comes in contact with the Methodology an experience that is matched to that person's strengths and desires. New procedures need to be added which identify the person's strengths and desires. Also needed are procedures which would provide for the development of appropriate experiences.

4. Step 1.5. The purpose of this step is to negotiate the decision making contract. This step needs to be revised so that a decision maker is given the option of contracting for an application of only certain sections of the Methodology. In its present form, step 1.5 only permits the decision maker to contract for an application of the entire Methodology. The author does not believe that each major process of the Methodology needs to be applied for every decision maker. Some decision makers may already possess their own set of activities for implementing a particular major process. These activities may be either formally or informally documented. These procedures may also be quite effective. If a decision maker already possesses a set of activities by which he/she can accomplish the purpose of a particular major process, then there may be no need to apply that major process for that decision maker. The major processes of the Methodology that should be applied for a given decision

maker are those major processes whose purposes the decision maker would have a great deal of difficulty in accomplishing without the Methodology. This step should be developed to the point where a distinction can be made between those major processes that the decision maker cannot carry out or would have great difficulty in carrying out and those major processes that the decision maker can carry out through the use of activities which may or may not be similar to those documented in the Methodology. Given this distinction, an application of the Methodology could then be tailored to the strengths of specific decision makers.

Before discussing those sections of the Methodology which should be tested using decision oriented research procedures, a caution should be noted. Developmental research, the design of new procedures should not go on indefinitely. Potential developers of the Methodology should be aware that sometimes in the interest of developing a usable Decision Making Methodology, certain gaps should be left unfilled. If the procedures needed to fill a gap hinder rather than focus the creativity of the decision maker, and this may happen if the procedures are unnecessarily detailed and therefore cumbersome, those procedures would be a liability rather than an asset with respect to helping the Methodology accomplish its purpose. If the Methodology's procedures are restrictive and inhibiting, then the Methodology itself will be hard pressed to aid a decision maker in the making of a decision that is optimal with respect to the decision maker's desires. Optimal decisions are not normally made by frustrated decision makers.

With regard to decision oriented research, the author believes that Version IV should be submitted to the same type of analysis as was Version III. That is, first the logic of Version IV should be analyzed and if serious problems are uncovered, they should be corrected through the design of new procedures. Version IV should then be field tested in an uncomplicated situation and procedures that do not work well should be either replaced or redesigned. If a researcher does not have enough resources for a field test of the entire Methodology, specific sections could be tested. What follows is the author's recommendations as to those sections of the Methodology that he believes should be tested first.

Step 1.6.0:
Plan This Application of the Methodology

One of the major differences between Version III and Version IV of Decision Making Methodology is the procedures to be used in planning the application of the Methodology. Without effective planning procedures, an application of the Methodology might very easily become unweildly. The planning procedures of Version III were found to be impractical. Hopefully, the planning procedures of Version IV will not have the same deficiency. However, the practicality of these procedures will not have been established until they are empirically tested. Therefore, it is recommended that the testing of step 1.6.0 be given a high priority in future investigations of the Methodology.

Step 4.0:
Conceptualize the Ideal Solution

The long form of Decision Making Methodology has been designed to be used in situations where a decision maker has a relatively large amount of resources for making decisions in a particular problem area. In such situations, the Methodology provides for the development of an ideal solution which serves as a model against which to design the solution that will actually be implemented. The development of an ideal solution is critical since that solution is the one that is most desirable from the perspective of the decision maker. Having such a model enables the decision maker to identify the solutions that will be most ideal, given the resources available for solving a particular problem. Such solutions may be considered optimal with respect to the decision maker's desires. Version IV contains new procedures for the development of a list of alternative ideal solutions. These procedures were developed because the author found the existing procedures of Version III to be confusing. However, the clarity of step 4.2 will not have been established until it is shown that the step can be actually used. Thus, the author believes that a useful piece of methodological research would be to submit the step to an empirical field test.

Step 6.16:
Provide for Feedback

The purpose of this step is to develop a mechanism that will provide a decision maker with data on the effectiveness of the solution's activities as they are being implemented. If this feedback mechanism does not work then the decision maker may be unaware of serious problems

that may arise during implementation. Uncorrected implementation problems may cause the solution to fail to accomplish its purpose. Therefore, it is critical that the feedback mechanism be effective. Because the effectiveness of the feedback mechanism has not been established through empirical test, it is recommended that this step be examined in future investigations of the Methodology.

Major Process 7.0:
Implement the Solution

No matter how much planning goes into a solution, a decision maker cannot be assured of its effectiveness until it is carried out. The final test of a solution is whether or not it works when it is implemented. Version III contained only three procedures for the implementation of the solution. Version IV contains a much more complete set of implementation procedures. Because Version IV contains a completely new draft of this major process and because this major process provides the final test of a solution's effectiveness, it is recommended that this major process be examined through the use of decision oriented research procedures.

The most serious problem encountered during the course of the field test was the selection of a surrogate decision maker. A surrogate decision maker is one who performs those procedures of the Methodology which some other decision maker cannot perform due to a scarcity of resources. A surrogate is not a replacement for the original decision maker. A surrogate is the decision maker's advocate. The surrogate represents the decision maker. When asked to perform a particular methodological procedure, the surrogate should ideally produce the exact

same results as would have been produced by the original decision maker. If the surrogate were to produce different results, then the surrogate would be acting in opposition to the original decision maker.

Version III contained no formally documented procedures for the selection of a surrogate decision maker. During the course of the field test, a surrogate decision maker had to be chosen. In choosing the surrogate, the original decision maker simply used his own innate sense of whom that person should be. However, as is documented in Chapter Five, when performing certain methodological activities, the surrogate decision maker produced results that were inconsistent with the original decision maker's initial intentions. Thus, the surrogate was not working effectively. Version IV contains a reasonably complete set of procedures for the selection of a surrogate decision maker. Hopefully, these procedures will enable a decision maker to choose an effective surrogate. However, the effectiveness of these procedures has not been established and for this reason the author believes that they should be tested and, if necessary, revised until they are relatively problem free.

This concludes the final section of the final chapter of this document. What follows is a series of six appendices. In Appendix One, the "short form" of Decision Making Methodology is presented. In Appendix Two, Draft VIII of Metamethodology is presented. Version III of Decision Making Methodology is presented in Appendix Three. This is the version that was examined during the course of the logical analysis. A dissemination methodology developed by Mr. William Welsh is presented in Appendix Four. A list of the one hundred and seventy five needs sentences developed during the initial stages of the field test are presented in

Appendix Five. The final appendix documents the new version of the Methodology that was developed during the course of this study. This new version is Version IV.

This study was conceived and carried out with the intention of making a significant contribution to the development of an effective Decision Making Methodology. Many members of the business and academic communities have recognized the need for an effective Decision Making Methodology. Prior to this study, this author and others had done a considerable amount of work on the development of a Decision Making Methodology. The most significant contribution of this study was the development of a version of the Methodology that is more complete and hopefully more effective than previous versions. This study has also laid the foundation for further research on the Methodology by identifying those sections of the newest version that the author believes should be further developed and/or field tested.

Decision making is an extremely complex phenomena, and by implication, the development of an effective Decision Making Methodology is also a complex undertaking. The detail contained in this study was necessitated by the complexity of the problem addressed. In the author's opinion, what has been reported could not have been abbreviated without seriously effecting the utility of the document for those who wish to do further research and development on the Decision Making Methodology.

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APPENDICES

APPENDIX ONE

THE SHORT FORM OF DECISION MAKING METHODOLOGY

The following is a set of procedures that provide a decision maker with a systematic, logical, and replicable way of deciding upon a solution to deal with a problem. In order to do this the decision maker should:

Steps

1.0 Plan this application of the Decision Making Methodology.

- 1.1 Determine and name the area of concern or problem about which the decision maker wants to make a decision with respect to determining a solution to the problem.
- 1.2 Enter in the Decision Making Log -- hereafter called the workbook:
  -- the name of the decision maker;
  -- his area of concern or problem;
  -- the amount of time he can spend on this application.
- 1.3 Allocate the decision maker's total time among the steps of the methodology.
  - 1.3.1 Multiply the total time by each of the percentages in the Resource Allocation Chart in the workbook.
  - 1.3.2 Enter these products in the appropriate boxes of the Resource Allocation Chart (in hours and minutes).

2.0 Identify Problems

- 2.1 Determine from the Resource Allocation Chart how much time is available for this step. All of Step 2.0 must be accomplished within this amount of time.
- 2.2 Determine the decision makers concerns about Who need What according to Whom, with respect to the problem area of this application.
  - 2.2.1 Have the decision maker list: (the Who)
    - the person or group involved in this problem whose needs are important to him.
  - 2.2.2 Have the decision maker list: (the What)
    - for this person or group, what kind of needs are important to him.
  - 2.2.3 Have the decision maker list: (the Whom)
    - for this person or group on the first list, whom could best define the specifics of the need.
  - 2.2.4 Have the decision maker combine the three lists to form his most important needs statement in the form "Who needs What according to Whom".
  - 2.2.5 If resources allow, ask other people who are concerned with the same area of concern or problem to do 2.2.1 - 2.2.4. Show these responses to the decision maker and ask the decision maker if he would like to change his statement.
  - 2.2.6 Fill in the Who, What, Whom lines in the workbook.
- 2.3 Define Who's needs for What, according to Whom.
  - 2.3.1 Fill in the name of the definer (the Whom) on the Definition of Needs page of the workbook.
  - 2.3.2 Ask the definer to imagine a situation in which (Who's) needs for (What) (From the needs statement) are being fully met.
  - 2.3.3 Ask the definer to list the things which indicate to him that the need is being fully met.

2.3.4 If resources allow, ask the definer to imagine a situation in which (Who's) needs for (What) are not being met at all.
2.3.5 If step 2.3.4 was done, add these items stated positively to the first list.
2.3.6 Ask the definer to prioritize the items on the list according to which are the most important components of the need.
2.3.7 Fill in the Definition of Needs page of the workbook with the top ten prioritized items from 2.3.6.

2.4 Estimate the degree to which each item of the need is met.
2.4.1 Ask the definer to consider separately each item on the prioritized list of items.
2.4.2 Ask the definer to estimate a percentage which indicates to what degree each need is met for the Who.
2.4.3 Enter these percentages on the Definition of Needs page of the workbook.
2.4.4 If resources allow, actually measure the extent to which the defined needs are met.

3.0 Determine a statement of the purpose with respect to the problem area with which this application of the methodology will deal.

3.1 Determine from the Resource Allocation Chart the time available for this step. All of step 3.0 must be accomplished within this amount of resources.
3.2 If resources allow, the decision maker should do at least one of the following tasks to determine the nature of the problem area:
3.2.1 Read the literature in the area.
3.2.2 Talk to people who work in the area.
3.2.3 Examine work being done in the area.
3.3 The decision maker uses the results of this analysis (3.2) and the results of the Definition of Needs (the Definition of Needs page of the workbook) to help him state the purpose he has in dealing with the problem area. The rest of this application of the methodology will be designed around this statement of purpose in order to deal effectively with the problem. e.g., the decision maker might choose to meet the need which was rated most unmet.
3.4 The decision maker tests the purpose against the following criteria:
- is it desirable?
- is it definable?
- is it practical?
3.5 The decision maker revises the purpose if necessary and recycles through 3.4.
3.6 Once all the answers to the questions in 3.4 are yes, write the purpose in the workbook.

4.0 Develop Alternative Solutions

4.1 Determine the amount of resources available for this step from the Resource Allocation Chart. All of step 4.0 must be accomplished within this amount of time.
4.2 Determine solutions to the purpose.
4.2.1 Put down on a separate piece of paper all solutions that you would label usual solutions. This includes solutions you have tried in the past with a similar problem.
4.2.2 Put down all the ways you can possibly accomplish the purpose. You are looking for the usual solutions to the problem.

4.2.3 If resources allow, on a second piece of paper write out all the ways you could fail to accomplish the purpose.

4.2.4 If Step 4.2.3 was performed, look at the list of ways you could fail to accomplish the purpose and use this list to produce solutions for the purpose.

4.3 Producing a final list of alternatives

4.3.1 Look at all lists and test for redundant solutions. Cross out all but one of the redundant solutions in each case of redundancy.

4.3.2 Enter in the workbook the list of alternative solutions.

5.0 Choose a Solution

5.1 Determine the amount of resources available for this step from the Resource Allocation Chart. All of step 5.0 must be accomplished within this amount of time.

5.2 Operationalization of the Purpose

5.2.1 Imagine a hypothetical situation in which your purpose has just been accomplished. All the people, place(s), objects, etc., involved with the purpose are in this situation, this includes yourself. Look at this situation; observe it very carefully. On a separate piece of paper, put down all the events, actions and verbalizations that tell you that your purpose has been accomplished.

5.2.2 If resources allow, have other people do the above and use their input to make changes to your list.

5.2.3 If resources allow and you ever had a similar problem before, think up all the criteria you used then to tell yourself that you had successfully accomplished this similar solution. Check your list to see if each of the criteria is on the list; for any criteria that are not on the list add them to the list.

5.2.4 Check through the list and for each criteria, decide which are truly criteria for you -- that is, if this criteria doesn't happen does that really tell me that my purpose has failed. Cross off any criteria that do not pass this test.

5.2.5 Choose the six most important criteria on this list. That is, choose those criteria on this list that tell you more than any others that your purpose is accomplished. (If there are more than six, then do not stop at six, but try to choose at least six.) Write these chosen criteria in the appropriate place in the workbook.

5.3 Choosing Appropriate Solution

5.3.1 Estimating probabilities of the success of the alternative solutions. Invent a short name for each alternative solution and enter it in the parentheses next to the description of the solution.

5.3.2 Take the first alternative solution on this list and look at it in relation to the criteria for accomplishing the purpose.

5.3.3 For each of the criteria in your workbook, decide whether the solution is likely to accomplish that criteria and put "L" in the appropriate box in the matrix if it is likely to (that is the chance is greater than 50% as you estimate it.) Put an "N" in the appropriate box of the matrix if the solution is not likely to meet the criteria.

5.3.4 For each criteria for which there is an "L" under the solution determine the probability that the solution will accomplish each of these criteria. Because you put an "L" in the box, these probabilities will be greater than or equal to .5. You must estimate how probable this is based on your perceptions of the solution.

5.3.5 For each criteria for which there is an "N" under the solution determine the probability that the solution will accomplish this criteria. This probability should be less than or equal to .49.

5.3.6 Do this process for <u>each</u> of the solutions you have put in the workbook. If your resources are short, prioritize the rest of the solutions as to the ones you feel most likely to accomplish the purpose, and then do the above process for the top three solutions in your priority order.

5.3.7 If resources allow, have other persons perform steps 5.3.2 to 5.3.6. Use their input to reconsider your choices and revise your probabilities if necessary.

6.0 Produce an Operational Design for the Solution

6.1 Determine the amount of resources available for this step from the Resource Allocation Chart. All of this step must be accomplished within this amount of time.

6.2 Determine the Major Elements of the Solution.

6.2.1 Imagine the solution being carried out and write down on a separate sheet of paper all the things you see happening in the carrying out of the solution.

6.2.2 If resources allow, have other people do step 6.2.1. Use their imput to revise your own list if desirable.

6.2.3 If there are only ten or less items on the first list, put them in the appropriate spot of the workbook. Then go on to step 6.3. If there are more than ten items go to E of this step.

6.2.4 Combine like items in the following ways:

6.2.4.1 First, see if any of the items are included in any of the other items, note this where it happens.

6.2.4.2 Second, see if any of the items can be combined logically together and are not subsets of any other item. Where this happens, note this and give those combinations a title.

6.2.4.3 You should combine in either or both of the above two ways until you get ten major items.

6.2.4.4 Make up a new list that shows the ten major items and their subitems and write the major items in the workbook.

6.3 Determine the Activities of the Major Parts

6.3.1 For each of the major elements of the solution, write down in the workbook all the activities necessary to carry through that element. Be as complete as you possibly can be. If any of the elements have subitems, include these in your lists if they are activities. If subitems are not activities, write down the activities necessary to carry out these subitems. The activities should be put in the list for that major element.

6.3.2 If resources allow, examine the literature for what activities have been suggested. Use this material to modify your own list.

6.3.3 Do this process for all of the major elements.

6.3.4 Go through each list and eliminate any unnecessary activities.

6.4 Determine the Chronological Order of Activities. The purpose of this is to complete the design of the plans for solving, or meeting, the purpose for the decision stated on page 3 of the workbook.

6.4.1 Take the list of activities arrived at in the previous step (page 5). Arrange all those activities in order of chronology, regardless of the part to which they belong. (Note: It is not important to arrange the order of the parts or to list the parts again. Just arrange the activities in order.) The activity which should occur first in time is arranged first. The activity which should occur next in time is arranged second and so on.

6.4.2 Once all the activities have been arranged in order, list them on the "Chronological Order of Activities" sheet of the decision making log (page 6).

6.5 Determine from the RAC on page 1 of the workbook, the resources available to implement the activities. All of the solutions must be accomplished within this amount of time.

6.6 Determine when the activities can be implemented using the following substeps.

6.6.1 Determine the earliest starting date (time) of the first activity listed. Enter this date (time) on the first "begin" line at the top, left, of page 6 in the decision making log.

6.6.2 Determine the latest (or last) date (time) when the last activity has to be completed. Enter this date (time) in the "End" line to the left of the last activity listed.

6.6.2.1 This might be determined by resources available (e.g. one week or two hours).

6.6.2.2 This might be determined by your subjective opinion.

6.6.2.3 This might be determined by a time constraint, e.g. vacation, holidays, deadlines of some sort; other dates like fiscal year, contract times, prespecified decision points.

6.6.3 Allocate the time, determined in step 3 above, between the first beginning date (4.1) and the last ending date (4.2) by estimating the minimum amount of time each activity needs to be accomplished. Note: You may have to do some rematching and juggling around between the resources in step 3 and the time estimates here.

6.7 In the workbook fill in all the beginning and end dates based on the estimate or projection.

6.7.1 If resources allow:
Since these are tentative predictions, they can and should be revised as reality information is available. If activity 1 runs shorter than estimated by several units of time, then this "saved" time can be added to the starting date of the next activity, or be reallocated some other place.
If time allocated runs over, then re-estimate time for each remaining activity and reallocate for each remaining activity. Or, simply deduct the lost time from another single activity which you would now determine before proceeding.

6.7.2 If resources allow:
Another alternative to 5.1 is to reevaluate the remaining activities to see if one or more activities could be deleted. If you could do so, you would and then recycle to 5.1.

6.7.3 If resources allow:
Determine if you find you have too many resources for the number of activities you have to do. If you do, reallocate resources to some other problem or decision you need to make.

7.0 Implement the activities. These activities must be completed within the time resources available for them.

7.1 Carry out the first activity on the list to the best of your ability.

7.1.1 Note at the right side of the activity in the log that the activity did or did not occur by entering a "D" for did occur and a "N" for did not occur.

7.1.2 If resources allow:
If you have run over time on one activity and do not want to abbreviate or delete any other activity on the list, allocate some more resources to this part of the decision making methodology.

7.1.3 If resources allow:
Reallocate resources if necessary, i.e. if you ran short or ran over the preestimated and allocated time, and proceed to the implementation of the next activity, and recycle through the substeps of 6.6.

7.2 If it is not possible for whatever reason to implement one or more activities, then proceed to implementing the next activity on the chronological list that can be implemented.

7.2.1 If resources allow:
If you can't implement an activity for some reason, and resources and desire allow, design another activity (or activities) to be implemented which could perform the same function or help to achieve the same goal as the one(s) you can not implement.

7.3 Recycle between 7.1 and 7.2 until all the activities are implemented as best as possible and/or until the resources run out (which should coincide with the activities being implemented if the resources were properly allocated earlier) and/or until the solution has worked and the purpose has been fulfilled.

7.4 Complete the Implementation Design State

7.4.1 This stage is complete when all the activities have been completed. Determine if this has happened by looking at your log sheet, page 7 and by noting the right-hand column.

7.4.1.1 An exception to this is that not all the activities have been completed because resources, including time, have run out. The implementation design stage would be "completed" in the sense of finished if all the activities have been implemented and some are still continuing. Determine if this is true.

7.4.2 This stage could be completed if the purpose is suddenly met. If the purpose is met, there is no need to continue systematically implementing activities to achieve that purpose.

7.4.3 This is also completed when the last "end" date, next to the last activity listed on the log sheet arrives.

7.4.4 If resources allow:
If you should decide that too many activities have not been completed, you could allocate additional resources and expand the amount of time and other resources to devote to continuing this step. If you decide to do this, step 7.4.4 is the place to do it.

7.4.5 Whichever of the above four substeps is appropriate, bring to "completion" step 7.0.

8.0 Evaluate the solution. The purpose of this is to determine the degree to which the purpose stated on page 3 has met.

8.1 Determine from the Resource Allocation Chart the amount of time available for this step. All of step 8.0 must be accomplished within this amount of time.

8.2 Go to page 4 where the purpose was operationalized and enter the operational components listed on that page in the appropriate spaces (A - E) on page 7 of the workbook.
That is, the working of component A on page 4 would be written in the space provided under A on page 7, and so on. If Component A was further operationalized, then you would list each of the components of A under A on page 7 rather than simply listing A itself. If B were further operationalized then these dimensions would be listed under B and not just B itself.
In other words, you would put the most operational dimensions of the purpose as operationalized on page 4 in the spaces provided on page 7.

8.3 For the first operational component listed (it should be under A) design an observational technique to determine if the alternative solution chosen (page 4) has met this particular component. Observational techniques should be designed to meet the following criteria:

8.3.1 Direct: Data collection should be as direct as possible.

8.3.2 Natural: Data collection should be conducted under as natural conditions as possible.

8.3.3 Unobtrusive: Data collection should be as unobtrusive as possible.

8.3.4 Simple: Data collection should be as simple as possible in construction, purpose and implementation.

8.3.5 Decision Maker Validity: The data collection devices or observational techniques should seem to be valid to the decision maker for whom data will be collected, i.e. to measure what he feels they are supposed to measure.

8.4 Implement the observational technique for the first operational component as designed in step 3.

8.4.1 Gather the data.

8.4.2 Record the data.

8.4.3 Decide to what degree the data indicate the achievement of this component, and enter this decision in the decision making log, page 7, to the right of the component.

8.4.4 If resources allow:
If the data do not allow for this kind of decision recycle through the design of observational techniques (step 8.3) and redesign the observational technique(s) for this particular component and on through step 8.4 again.

8.4.5 If resources allow:
If the data still do not allow for this kind of decision, then perhaps the operational component is not operationalized sufficiently for data gathering purposes. In this case, you would have to recycle back to the Operationalization of the Purpose section of the methodology and continue operationalizing this component.

8.5 Recycle through 8.3 and 8.4 until all the components listed on the left side of page 7 have had observational techniques designed and implemented and data collected; and, decision have been made assessing the degree of success or achievement about each component, which information would be recorded to the right of the component on page 7 of the workbook in the space provided.

8.6 Identify which component(s) have not been sufficiently met, based upon your decisions in 4.3. Determine which of the following should be done. If none go to step 1.0 for the next area of concern.
8.6.1 The activities should be redesigned.
8.6.2 The major elements of the solution should be redesigned.
8.6.3 A different solution should have been chosen.
8.6.4 The purpose for the solution was not properly defined.
8.6.5 The purpose for the solution should be restated.
8.6.6 The needs analysis should be redone.
8.6.7 The area of concern should be restated.

8.7 Reapply the methodology beginning with step 1.0 making only those changes determined in 8.6 above.

DECISION MAKING LOG

_____ Name of Decision Maker

_____ Area of Concern

_____ Amount of time the decision maker can spend on this problem area (in hours).

Resourse Allocation Chart

Process	%	Hours
Identify Problems	10	
State Purpose	2	
Alternative Solutions	10	
Choose Solution	10	
Operational Design	18	
Implement Design	40	
Evaluation	10	

Who _____

Needs what _____

According to whom _____

Definition of Needs

_____ Name (Role) of definer

Priority	Item	Degree to which met
(1)	_____	( )
(2)	_____	( )
(3)	_____	( )
(4)	_____	( )
(5)	_____	( )
(6)	_____	( )
(7)	_____	( )
(8)	_____	( )
(9)	_____	( )
(10)	_____	( )

Purpose _____

_____

_____

Description of alternative solutions

( ) _____

_____

_____

_____

( ) _____

_____

_____

_____

( ) _____

_____

_____

_____

( ) _____

_____

_____

_____

( ) _____

_____

_____

_____

Operationalzation of Purpose

A _____

B _____

C _____

D _____

E _____

F _____

	Alt I short name	Alt II short name	Alt III short name	Alt IV short name
A				
B				
C				
D				
E				
F				

Alternative Chosen _____

Major Elements of Solution

1. _____ 6. _____

2. _____ 7. _____

3. _____ 8. _____

4. _____ 9. _____

5. _____ 10. _____

Activities of Part 1

Activities of Part 2

Activities of Part 3

Activities of Part 4

Chronological Order of Activities

n	End			did/did not
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		
		16		
		17		
		18		
		19		
		20		
		21		
		22		

Data on Accomplishment of Purpose

erationlization of Purpose

A	
B	
C	
D	
E	

APPENDIX TWO

METAMETHODOLOGY DRAFT VIII

Metamethodology
Draft VIII

Tom Hutchinson and Jim Thomann
October, 1974

I. Prepare to use Metamethodology

A. Learn how to apply Metamethodology

1. Take a course on Metamethodology, if a course is available.

2. Read all the documentation on Metamethodology.

B. Decide how to use the available resources

1. Determine how much of what resources are available to be used in the development of a methodology.

2. Allocate the actual amount of your time available or 100 hours of your time, whichever is smaller, as suggested in Figure A.

3. When these allocations are used up, allocate half of the remaining resources as you choose in Figure A.

4. When these allocations are used up, allocate the remaining resources as you choose in Figure A.

5. If any resources remain, go to step II.

6. Get more resources and go to step I.B.

II. Choose a problem

A. Examine your interests and, if possible, simply choose a problem for which you would like to provide a methodological solution and go to step III.

B. Identify sources of problem statements and, if possible, choose one of these problems if you would like to provide a methodological solution and go to step III.

C. Allocate additional resources to Major Process II and use the Coffing Client-Demand Methodology to choose a problem.

Figure 8

Resource Allocation Chart

Major Process	First 100 hrs. or less %	First 100 hrs. or less amount	Second Allocation	Third Allocation
II	5			
III	10			
IV	10			
V	20			
VI	10			
VII	35			
VIII	10			

[N.B. If at any time you find yourself reading any of the steps below and nothing is happening, try the following four steps:

1) Identify all the roles necessary in this use of Meta-methodology.

2) Define these roles.

3) Determine the sequence in which the roles should be taken on by the user.

4) Do each of these roles in the sequence determined above.]

III. State a purpose for your methodology by analyzing the problem area and determining a purpose that will solve the problem.

A. Investigate the problem area by allocating your resources to one or more of the following activities.

1. Read the literature in the area.

2. Talk to people who work in the area.

3. Examine work being done in the area.

4. Brainstorm about the problem area.

5. Try out tools that already exist in problem area.

B. Narrow down area into manageable piece (focus).

1. If the problem area is already small enough to be manageable, go to step III, C.

2. Choose a piece of the problem area and go to step III, A.

C. Investigate purposes within the chosen piece of the problem area.

1. Brainstorm purposes that will solve the chosen problem.

2. Read the literature applicable to the chosen problem to identify stated or implied purposes.

3. Ask others for purposes they think will solve the chosen problem.

D. If more than one purpose has resulted from the previous step, then choose the most appropriate one.

E. Check chosen purpose against following two criteria:

1. Check purpose to see that it is not trivial.

a) See if some unimportant event could occur which would satisfy the stated purpose. For example, if the purpose was as follows: to build educational products; then the event of making a ruler would satisfy the purpose. Therefore, the purpose is trivial. Consider the purpose: to build curricula. A bad curricula is still a curricula and would satisfy the purpose, therefore, the purpose is trivial.

b) If the purpose is judged to be trivial, revise the purpose and repeat step II, E, 1, a).

2. Check the purpose to see if it really solves the problem you have in mind.

a) Imagine that the purpose is accomplished. Could the problem still exist?

b) If yes, revise the purpose and go to step II, E, 1, a.

F. If resources warrant, show purpose to others for their critique based on the above two criteria.

G. Write out purpose and commit yourself to it. (If you can say why you don't like it, then revise and recycle to E. If you can't say why you don't like it, then go on to Step III.)

IV. Test the purpose by the following criteria:

A. Is the purpose desirable?

1. Use one of the following methods -- where not obvious use Complex Method.

a) Simple Method, do one or more of the following:

i) Answer question yourself with rationale

ii) Get diverse groups to answer question

iii) Check notes from previous literature review and check any other literature on the area to see if purpose is desirable.

b) Complex Method -- use Coffing Client-Demand Methodology

2. Revise the purpose if necessary and go to step II, E, 1, a).

B. Is the purpose operationalizable?

1. Use "Operationalization of Fuzzy Concepts"

[N.B. It is not necessary to do a complete operationalization at this point. It is only necessary to find if the purpose can be operationalized.]

2. Repeat step III, A, in light of operationalization and revise if necessary.

C. Is the purpose practicable? Do one or more of the following:

1. Answer question yourself in terms of

a) Is the development of a methodology practical given this purpose?

b) Once developed would the methodology be a practical way to accomplish the purpose?

2. Get diverse groups to answer questions 1.a) and 1.b) above.

a) Methodologists answer question of C.1.a)

b) Methodologists and potential users answer question of C.1.b)

3. Revise the purpose if necessary and recycle through A and B; otherwise go to D.

D. Are existing methodologies insufficient?

1. Test in the following ways.

a) Search area for existing methodologies.

b) Take found methodologies and test them against definition of methodology. If they all fail go to Step IV.

c) Are they designed to accomplish your purpose? If not go to Step IV.

d) Does any one of them accomplish your purpose? If not go to Step IV.

e) Are these practical? (See if they are used.) If not go to Step IV.

f) Are they desirable? If all are not, go to Step IV.

g) Is any one complete? (You may work on it if it is not.)

2. Revise the purpose and recycle through tests, if necessary.

V. Once all answers to III are yes, then analyze the implications of the purpose for the development of methodology. (This is a way of identifying the attributes that the methodology must have.)

A. Use the following method to analyze the implications of the purpose. (Hutchinson says "Problem implies its own solutions." In this case, the implications of the purpose supply the first approximation of the major elements of the methodology.)

1. a) Imagine and write down in what ways you could fail to accomplish the purpose.

b) Imagine and write down in what ways you can accomplish the purpose, avoiding all the problems.

c) Imagine the purpose being accomplished; write down what is happening.

d) If resources permit and you wish to, generate alternatives to the items identified in a), b), and c) above.

i) For each element determined through b + c, determine all possible alternatives to accomplish the purpose.

ii) Create one list from all the lists generated in the previous step. For those dimensions generated in a., change their statements so that they state a procedure or procedures to solve the problem they originally identified.

iii) Test the completeness of the above list by using one or more of the following methods to generate alternative lists of dimensions. Then examine these new lists. For each dimension not on the list produced in d.ii) above that you want on that list, add it to the list. Add any other dimensions to the list that you think of while doing this process which are not already on the list and which you want on the list.

1) Ask others to do steps a - c.

2) Think up alternatives which have nothing to do with this purpose and consider whether they do or not.

3) Go back to list generated in b and c, and consider again whether any of those should be on list and add any new ones.

4) Ask yourself if your alternatives have any alternatives to them.

5) Ask what bad alternatives exist that are not on this list and how they could be changed to good alternatives.

6) Use the possible methodologies generated in Step III, D.

7) Use any other tests of your own choosing.

2. Choose the initial set of major processes for the methodology.

a) Look over the list of dimensions and choose those which you feel will accomplish the purpose.

b) Combine together any dimensions that appear to go together.

c) Write out a new list with any combined dimensions listed together.

B. Organize the attribute into a rational order of steps.

1. Determine which implications are not necessary for the methodology to accomplish the purpose and strike them from list.

2. Determine which implications are contained in others and note that. Determine which implications can be combined to make one step, and give those a name.

a) Combine any dimensions on the list which are related and define a single process when combined but are not logical substeps of each other.

b) Create a major step naming this process and list the combined dimensions as substeps of this.

3. Ask which implications you would have to accomplish first in order to accomplish the rest.

4. Write it out as the first step.

5. Ask which implication would now be first, given that the first one is accomplished.

6. Write it down as the second step.

7. Continue this process until all major implications are accounted for.

8. Order any substeps by cycling through 3 - 7.

9. Check to see if the order has a logical flow to it.

10. Check to make sure that all implications are stated procedurally.

    a) For example, if a step reads "objectives", it is not stated procedurally.

    b) If the step is not stated procedurally rewrite it. For example, "choose objectives."

11. Write out a revised list.

12. Check completion of ordering by asking others (at least one) to give an ordering of implications with explanation of why, if possible, without showing them your ordering. This can be verbal or written, depending on the resources available.

13. Do a revised ordering based on responses from 12.

14. Give revised ordered list to others experienced in the problem area for critique.

    a) Write out purpose of methodology.

    b) Write out following statement:

    Please critique the list of steps designed to accomplish the above purpose and point out those steps that you do not understand, steps you feel should be left out, and any steps, concepts and/or ideas that you feel should be added.

    (1. Look at the first major process and ask yourself if anything has to be done before that process in order to accomplish the purpose.

    (2. If there is, add a new major process at the beginning of the methodology and go to step (1. above.

    (3. Look at the last major process and ask yourself if anything else has to be done, e.g., testing to see if the application has been successful.

    (4. If there is, add a new major process to the end and go to step (3. above.

C. Write out final list to be used throughout rest of methodology. Mark it Draft I, your name, and date.

VI. Operationalize the purpose.

A. The straight analysis technique

1. Identify the fuzzy concepts in the purpose.

2. Directly operationalize each fuzzy concept.

3. Directly operationalize the interaction among fuzzy concepts.

4. Test the criteria for completeness in a manner of your choosing and revise them if necessary.

B. Review the final set of components. If you are unsatisfied go to C; otherwise commit yourself to the set of components and go to Step VII.

C. Revise the components. If you are still unsatisfied go to D; otherwise commit yourself to the revised set of components and go to Step VII.

D. Use Hutchinson's "Operationalization of Fuzzy Concepts."

VII. Design Procedures

[N.B. Design or redesign can be done at any level of breakdown, including the highest.]

A. Identify the first (next) step to be designed (i.e., the first crucial step where it is not clear that the step would be easy to develop).

1. Examine each step of the draft of the methodology for gaps. Unoperational steps or breaks in continuity.

2. When a gap is found, determine if it is crucial. Use the operationalization of the purpose as criteria to determine if the gap is crucial.

3. If the gap is not crucial, go back to 1. and continue to examine; otherwise go to 4.

4. Determine if gap is hard to develop.

a) Answer this question: When I read this step does it convey to me what must be done to accomplish it?

b) If the answer is no, go to B; otherwise go to 5.

5. Cycle back to 1. If no gaps were found that fit both criteria then identify "crucial" gaps and develop those. If no "crucial" gaps were found then develop any gaps.

B. Identify the step's subpurpose. This is usually accomplished by adding the word "to" in front of the step.

C. Analyze implications of subpurpose in terms of main purpose.

a. Use the following method to analyze implications of the subpurpose:

1. a) Imagine and write down in what ways you could fail to accomplish the purpose.

b) Imagine and write down in what ways you can accomplish the purpose, avoiding all the problems.

c) Imagine the purpose being accomplished; write down what is happening.

d) i) For each element determined through b + c, determine all possible alternatives to accomplish the purpose.

ii) Create one list from all the lists generated in the previous step. For those dimensions generated in a., change their statements so that they state a procedure or procedures to solve the problems they originally identified.

iii) Test the completeness of the above list by using one or more of the following methods to generate alternative lists of dimensions. Then examine these new lists. For each dimension not on the list produced in d.ii) above that you want on that list, add it to the list. Add any other dimensions to the list that you think of while doing this process which are not already on the list and which you want on the list.

1) Ask others to do steps a - c.

2) Think up alternatives which have nothing to do with this purpose and consider whether they do or not.

3) Go back to list generated in b and c, and consider again whether any of those should be on list and add any new ones.

4) Ask yourself if your alternatives have any alternatives to them.

5) Ask what bad alternatives exist that are not on this list and how they could be changed to good alternatives.

6) Use any other tests of your own choosing.

2. Choose the initial set of major steps for the major process.

   a) Look over the list of dimensions and choose those you feel will accomplish the purpose.

   b) Combine together any dimensions that appear to go together.

   c) Write out a new list with any combined dimensions listed together.

D. Organize the attributes into a rational order of steps.

1. Determine which implications are not necessary for the methodology (accomplishing purpose) and strike them from list.

2. Determine which implications are contained in others and note that. Determine which implications can be combined to make one step, and give those a name.

   a) Combine any dimensions on the list which are related and define a single process when combined but are not logical substeps of each other.

   b) Create a major step naming this process and list the combined dimensions as substeps of this.

3. Ask which implication you would have to accomplish first in order to accomplish the rest.

4. Write it out as first step.

5. Ask which implication would now be first, given the first one is accomplished.

6. Write it down as second step.

7. Do this process until all major implications are accounted for.

8. Order any substeps by cycling through 3 - 7.

9. Check to see if order has logical flow to it.

10. Check to make sure all implications are stated procedurally.

11. Check completion of ordering by asking others (at least one) to give an ordering of implication with explanation of why, if possible, without showing them your ordering. This can be verbal or written, depending on the resources available.

12. Do a revised ordering based on responses from 11.

13. Give revised ordered list to others experienced in problem area for critique.

    a) Write out purpose of step under development and methodology.

    b) Write out following statement:

       Please critique the list of steps designed to accomplish the above purpose and point out those steps that you do not understand, steps you feel should be left out, and any steps, concepts and/or ideas that you feel should be added.

    c) Present a copy of the above two statements along with a copy of the processes of the step under development to each of the individuals who will critique these processes.

14. Do a final ordering and write it out.

    a) Add in any steps or functions that are implied by the existing steps at the same level of abstraction.

    b) Identify the anchoring steps for the step under development at this time.

    c) Write out final list to be used throughout rest of methodology.

E. Determine the amount of completeness and test for it.

F. Examine the logic of the step under design in terms of subpurpose and main purpose.

G. Fill in the gaps that are found and then recycle to VII.E. If no gaps, go on to VII.G.

H. Examine the logic of entire methodology and its parts in terms of main purpose in light of the step under development.

I. Redesign step and/or methodology and recycle to VII.G. If no gaps, then go to VII.I.

J. Recycle to VII.A. until you feel that further applications of VII will not produce sufficient improvement to warrant spending of resources.

K. Before going to VIII, write out a new draft of the methodology including all changes made to date as a result of VII. Mark this Draft II, your name, and date.

[N.B. One may conduct a field test as well as running through VII by using the data obtained in the field test to help out in the development procedures.]

VIII. Test and then revise the purpose and/or procedures if necessary.

A. Field test the methodology. See David Rosen's dissertation (UMass-Amherst) for more detail.

1. Determine what is to be field tested -- a part of the methodology or the entire methodology.

2. Determine the simplest field test not already done on the subject of the field test.

3. Write out the purpose (of the methodology or the part to be tested) and its operationalization.

4. Determine your goals for the field test. If this is not easy to do, use the Goals Process from the Fortune/Hutchinson Evaluation Methodology.

5. Develop the measures for the field test from the operationalization of the purpose and your goals. If this is not easy to do, use the Measuring Process from the Fortune/Hutchinson Evaluation Methodology.

6. Do the field test and carry through the observations.

7. Use the data to revise the methodology or the part by recycling to Step VII.

B. Conclusion-oriented research of methodology; if necessary, redesign (use Step VII). Use the Knowledge Generation Methodology.

APPENDIX THREE

DECISION MAKING METHODOLOGY

VERSION III

0.0 Purpose: To make decisions that are optional with respect to the desires of a decision maker.

1.0 Prepare for the utilization of the methodology.

1.1 The reader is asked to determine his/her frame of reference by identifying which of the following groups that he or she belongs to.

1.1.1 A person who is interested in learning a methodology but who has no substantial experience in methodologies. In this case the reader should proceed to step 1.4.4.4.6 (Preparing the methodologist.)

1.1.2 A person who is interested in having a methodology applied for them in order to solve some problem. In this case the reader should proceed to step 1.5.2.2 (Negotiate the contract).

1.1.3 A person who has some substantial experience in methodologies. In this case the reader should

1.1.3.1 State the experience that the reader has in methodologies

1.1.3.2 State the purpose that the reader has in dealing with this methodology

1.1.3.3 Cycle to the step(s) that best accomplish the reader's purpose.

1.2 Develop a current version of the methodology. (This step may be performed anywhere in the utilization of a methodology. It is included here in order to highlight the desireability of developing a current version of a methodology prior to any substantial effort

to utilize it through teaching, application, or dissemination.

1.2.0 Plan the implementation of this step.

1.2.1 Choose the methodology to be developed.

1.2.1.1 Determine the population that the developer is interested in serving.

1.2.1.2 Determine the methodologies that are most needed by that population.

1.2.1.3 Determine the methodologies that the developer is most capable of developing.

1.2.1.4 Interface 1.2.1.2 and 1.2.1.3.

1.2.1.5 Choose the methodology to be developed based on the needs of the population and the strengths of the developer.

1.2.1.6 If the population has need of a methodology with which the developer has no expertise the developer may either attempt to learn the needed methodology or he/she may call upon another methodologist who does have the expertise. If the population has a need for which no methodology exists the developer may use meta-methodology to develop a methodology to meet the need or he may call upon another methodologist to develop a methodology to meet the need.

1.2.2 The developer identifies all those who have utilized any version of the methodology to be developed.

1.2.2.1 The developer identifies all people to whom the methodology was/is being taught.

1.2.2.2 The developer identifies all people for whom the methodology was/is being applied.

1.2.2.3 The developer identifies other methodologists who have taught or applied the methodology.

1.2.2.4 The developer identifies any other people who have had substantial contact with the methodology through participation in discussions, going to workshops, working with the original developers, citing the methodology in dissertations, critics etc.

1.2.2.5 The developer combines all lists into one list.

1.2.3 Test the list of utilizers for completeness.

1.2.3.1 Have other methodologists do 1.2.2.

1.2.3.2 Repeat step 1.2.2 for those methodologies that have rules and procedures in common with the methodology to be developed.

1.2.3.2.1 Identify other methodologies.

1.2.3.2.2 Identify common rules and procedures.

1.2.3.2.3 Identify those who have expertise in applying the common rules and procedures.

1.2.3.2.4 Have these people perform step 1.2.2

1.2.3.3 Combine all the lists of utilizers into one common list.

1.2.3.4 Prioritize the utilizers.

1.2.4 Identify gaps found in the methodology by the utilizers.

1.2.4.1 From the prioritized list of utilizers choose a manageable number to work with.

1.2.4.2 Secure the cooperation of the utilizers.

1.2.4.3 Ask each utilizer the following questions:

1.2.4.3.1 Did your utilization of the methodology identify any gaps?

1.2.4.3.2 Of these gaps were any filled and if so what were the rules and procedures used to fill the gaps?

1.2.4.4 Formulate the answers to the above questions into a list of filled and unfilled gaps. Where a gap has been filled also include the rules and procedures used to fill the gap.

1.2.4.5 Test this list for completness by presenting the answers of other utilizers.

1.2.4.6 Repeat the above steps until all the choosen utilizers have answered the questions or until the resources have run out.

1.2.4.7 Combine the results of the last three steps into a single list of gaps both filled and unfilled. Where a gap has been filled include the rules and procedures used to fill the gap.

5.

1.2.5 Test the list of gaps for completeness.

1.2.5.1 Repeat step 1.2.4 for a different group of utilizers.

1.2.5.2 Do any combination of the following things.

1.2.5.2.1 Read the latest version of the methodology in order to identify gaps.

1.2.5.2.2 Teach the methodology and document all problems.

1.2.5.2.3 Apply the methodology and document all problems.

1.2.5.2.4 Answer the question in 1.2.4

1.2.5.3 Repeat step 1.2.4.3 for those methodologists identified in 1.2.3.3.

1.2.5.4 Make any needed changes in the list of gaps based on the above tests of completeness.

1.2.5.5 Prioritize the list of unfilled gaps.

1.2.5.6 Prioritize the list of filled gaps together with the rules and procedures used to fill them.

1.2.6 Further develop the methodology by filling the most critical unfilled gaps.

1.2.6.1 Acquire a current version of the methodology.

1.2.6.2 Review the methodology in light of the prioritized list of unfilled gaps to determine what gaps are still unfilled.

1.2.6.3 Review the methodology in light of the prioritized list of filled gaps to determine what newly developed pieces of the methodology have not been fully

1.2.6.4 Combine the results of the last two reviews into a single list of "developmental tasks"

1.2.6.5 Operationalize the purpose of the methodology.

1.2.6.6 Choose that "developmental task" which is most critical to the methodology accomplishing its purpose and about which the developer is unclear how to proceed. If the methodology is highly developed the developer may choose to field test it using either conclusion or decision oriented research procedures. In this case the developer should cycle to evaluation methodology (decision oriented research) or to knowledge generation methodology (conclusion oriented research).

1.2.6.7 Utilize meta-methodology to accomplish the chosen developmental task by either integrating an already developed piece of the methodology or by filling an unfilled gap.

1.2.6.8 Repeat the above two steps until resources run out or until the developer is content with the current state of development.

1.2.7 Evaluate.

1.3 Disseminate the methodology.

1.3.1 Plan the implementation of this step.

1.3.2 Choose the methodology to be disseminate.

1.3.2.1 Simple method - use the interests of the methodologist.

1.3.2.2 Complex method - use the Coffing client demand methodology.

1.3.3 Define the class of problems that the methodology is capable of solving.

1.3.3.1 Develop a list of all the needs which the methodology can/does fulfill.

1.3.3.2 Test this list for completeness by doing any combination of the following.

1.3.3.2.1 Ask other methodologists to identify the needs which the methodlogy can/does fulfill.

1.3.3.2.2 Review the methodology's rationale in order to identify needs that it meets.

1.3.3.2.3 Review any logs of the application of the methodology in order to identify needs that it meets.

1.3.3.2.4 Determine what needs are met by each major process of the methodology.

1.3.3.2.5 Compile a list of needs met by tools similar to the methodology.

1.3.3.2.6 Compile a list of needs met by methodology which are similar to the one being disseminated.

1.3.3.2.7 Combine all lists into one list of needs.

1.3.4 Develop a list of potential utilizers of the methodology.

1.3.4.1 For each of the above needs determine who has the need.

1.3.4.2 Test this list for completeness by doing any combination of the following things.

1.3.4.2.1 Read literature, talk to people, and examine work being done with respect to the methodology which is being disseminated.

1.3.4.2.2 Analyze the implications of the methodology's purpose with respect to identifying potential utilizers.

1.3.4.2.3 State the purpose that the methodologist has in disseminating the methodology and then analyze the implications of that purpose so as to identify potential utilizers.

1.3.4.2.4 Repeat steps 1.2.2 and 1.2.3 in the "Develop a current version of the methodology" step.

1.3.4.2.5 Identify all those who have actively sought out the methodologist with respect to learning the methodology or having it applied.

1.3.4.2.6 Combine all the above lists into a single list of potential utilizers of the methodology.

1.3.5 Identify the most appropriate potential utilizer.

1.3.5.1 Develop a list of concepts which are critical to the utilization of any methodology.

1.3.5.2 Test the completeness of the above list by doing any combination of the following tasks.

1.3.5.2.1 Review the original list to see if any of the following concepts should be included.

- class of problems
- well defined purpose
- definition of a methodology
- decision maker validity

1.3.5.2.2 Review successful and unsuccessful applications of the methodology in order to determine critical concepts.

1.3.5.2.3 Review the rationale for the development of the methodology.

1.3.5.2.4 Have other methodologists repeat the above steps.

1.3.5.2.5 Combine all the above lists into a single list of critical concepts.

1.3.5.3 Choose the concepts to be worked with

1.3.5.3.1 State the purpose that the methodologist has in disseminating the methodology (this may have already been done in step 1.3.4.2.3).

1.3.5.3.2 Operationally define the purpose of dissemination.

1.3.5.3.3 Choose the concept(s) that most completely satisfy the definition of the dissemination purpose.

1.3.5.4 Operationally define the chosen concepts.

1.3.5.5 Plan for the distribution of the concept's definition to the potential utilizer.

1.3.5.6 Plan how to determine the desireability of the definition to the potential utilizers.

1.3.5.7 Integrate the above two plans into a single plan.

1.3.5.8 Implement the above plan.

1.3.5.9 Remove from the list of potential utilizers all those for whom the critical concepts are undesireable.

1.3.6 Determine the degree to which the methodology being disseminated will solve the problems of the potential utilizer.

1.3.6.1 Have the potential utilizer test the purpose of the methodology against the criteria for an acceptable purpose as found in meta-methodology.

1.3.6.2 If the purpose is unacceptable either:

1.3.6.2.1 Stop work and refer the potential utilizer to other solutions which may solve the problem.

1.3.6.2.2 Develop a purpose which is acceptable and then build a methodology that will accomplish this purpose.

1.3.6.2.3 Refer the potential utilizers to another methodology.

1.3.6.3 Operationally define the purpose of the methodology in terms of process and product. If at this point you choose to further develop the methodology recycle to step 1.2 (Develop a current version of the methodology).

1.3.6.4 Prioritize the components of the definition.

1.3.6.5 Determine the problems faced by the potential utilizer which the methodology is capable of solving.

1.3.6.6 Choose the problem which the methodology will be applied to.

1.3.6.7 Operationally define the chosen problem.

1.3.6.8 Prioritize the operational components of the chosen problem.

1.3.6.9 Interface the definition of the problem with the definition of the methodology in order to create a list of all possible tests of the methodology relative to solving the chosen problem. (Refer to the goals/parts interface step in evaluation methodology.)

1.3.6.10 Choose the test(s) to be performed.

1.3.6.11 Develop a plan for carrying out the plan.

1.3.6.12 Implement the plan.

1.3.6.13 Repeat the above three steps until either the resources run out or until the potential utilizer thinks that there is enough data present to decide whether or not the methodology can solve the problem.

1.3.6.14 Review the results of testing by asking the potential utilizer the following question. "Is there any critical part of your problem that definitely cannot be met by the methodology?"

1.3.6.15 If the answer to the above question is yes then either:

1.3.6.15.1 Stop work and refer the potential utilizer to other solutions.

1.3.6.15.2 Carry out additional testing.

1.3.6.15.3 Refer the potential utilizer to another methodology.

1.3.6.15.4 Build another methodology.

1.3.7 Plan for the utilization of the methodology.

1.3.7.1 Cycle to "prepare the methodologist" if the utilizer wants to learn the methodology.

1.3.7.2 Cycle to "contract negotiation" if the utilizer wants the methodology to be applied to solve a problem.

1.3.7.3 Cycle to "develop a current version of the methodology" if the utilizer wants to further develop the methodology.

1.3.7.4 Cycle to any task of the potential utilizers choosing.

1.3.8 Evaluate.

1.4 Prepare the methodologist.

1.4.1 Plan the application of this step.

1.4.2 Choose the methodology to be taught.

1.4.3 Develop a current version of the methodology (Refer to step 1.2 Develop a current version of the methodology.)

1.4.4 Select the group to whom the methodology will be taught.

1.4.4.1 State the purpose that the methodologist has in teaching this particular methodology.

1.4.4.2 Test this purpose against the criteria for an acceptable purpose as documented in meta-methodology and revise if necessary.

1.4.4.3 Develop a list of potential methodologists by analyzing the implications of the teaching purpose.

1.4.4.3.1 Complete the following sentence. "I could accomplish my teaching purpose by teaching the methodology to _____."

1.4.4.3.2 Complete the following sentence. "I could fail to accomplish my teaching purpose if I did not teach the methodology to _____."

1.4.4.3.3 Complete the following sentence. "If I were actually accomplishing my teaching purpose I would be teaching the methodology to _____."

1.4.4.3.4 Combine your responses to the above three sentences into a single list of potential methodologists.

1.4.4.4 Test the completeness of the above list by doing any combination of the following tasks.

1.4.4.4.1 Think up all the possible alternatives to each potential methodologist.

1.4.4.4.2 Think up all those people who have nothing to do with your purpose in teaching the methodology.

1.4.4.4.3 Develop a list of all those who have or who are interested in learning other methodologies and then consider if they might be interested in learning this particular methodology.

1.4.4.4.4 Repeat appropriate parts of 1.2.2 (1.2.2.2 + 1.2.2.4) and 1.2.3.

1.4.4.4.5 Repeat appropriate parts of 1.3.3 and 1.3.4.

1.4.4.4.6 Add to your list any individual or group who has actively sought out the methodologist for the purpose of learning the methodology.

1.4.4.5 Operationally define the teaching purpose.

1.4.4.6 Choose that group of potential methodologists that most completely satisfies the defined teaching purpose. At this point the methodologist may want to refer to steps 1.3.5 and 1.3.6 in order to identify additional criteria and procedures which may be used in the selection of the learning group.

1.4.4.7 Each member of the choosen learning group confirms their intention of learning the methodology.

1.4.5 Determine the needs of the learning group.

1.4.5.1 The methodologist decides whether to teach the group as a group or as individuals.

1.4.5.2 The methodologist identifies the group's/individual's area of application by obtaining answers to the following questions.

1.4.5.2.1 Are you learning the methodology so that you may solve a particular problem? If so identify that problem.

1.4.5.2.2 Are you learning the methodology so that you may solve an as of yet unspecified problem? If so identify the area in which the problem is found.

1.4.5.2.3 Are you learning the methodology just out of general interest? If so develop a statement which will accurately describe your interest in the methodology.

1.4.5.3 Determine what the group/individuals need to know with respect to implementing the methodology in their

particular area of application (Refer to the Coffing/Hutchinson Needs Analysis Methodology.)

1.4.5.4 Choose the learning need(s) to be worked on and develop the sequence in which they will be taught.

1.4.6 Develop a teaching purpose which is specific with respect to the needs of this particular learning group.

1.4.6.1 Investigate the area of the chosen learning need(s).

1.4.6.2 Combine the results of the above analysis with the results of the needs analysis in order to state a teaching purpose which is specific with respect to this particular learning group.

1.4.6.3 Test the teaching purpose. (Refer to Meta-Methodology Step III.)

1.4.6.4 If necessary revise the purpose until it is acceptable.

1.4.7 Develop the teaching sequence.

1.4.7.1 Develop a sequenced series of learning objectives.

1.4.7.1.1 Analyze the implication of the teaching purpose by completing the following sentences.

1.4.7.1.1.1 I could accomplish the teaching purpose if the group learned _____.

1.4.7.1.1.2 I would fail to accomplish the teaching purpose if the group did not learn _____.

1.4.7.1.1.3 If I were actually accomplishing the teaching purpose the group would be learning _____.

1.4.7.1.1.4 Combine your answers to each of the above sentences into a single list of learning objectives.

1.4.7.1.2 Test the above list for completeness.

1.4.7.1.3 Sequence of the tested list of learning objectives.

1.4.7.2 Develop a strategy to teach each one of the sequenced learning objectives.

1.4.7.2.1 Choose the first (next) learning objective for which a teaching strategy is to be developed.

1.4.7.2.2 State the purpose of the chosen learning objective.

1.4.7.2.3 Develop an exhaustive set of alternative plans for teaching the objective by analyzing the implications of the objectives purpose.

1.4.7.2.4 Choose the alternative to be implemented.

1.4.7.2.5 Plan for the implementation of the chosen alternative.

1.4.7.2.6 If possible field test the planned teaching strategy.

1.4.7.2.7 Repeat the above process for each objective or move on once a single teaching strategy has been developed for a single objective.

1.4.7.3 Develop a simulation for each objective for which a teaching strategy has been designed. (Refer to Instructional Simulation Design Methodology.)

1.4.7.3.1 State the purpose of the simulation.

1.4.7.3.2 Define the purpose of the simulation.

1.4.7.3.3 Develop the experential technique.

1.4.7.3.4 If possible field test the simulation.

1.4.7.3.5 Repeat the above process for each objective or move on once a single simulation has been developed for a single objective.

1.4.7.4 Integrate the teaching strategy(ies) with the simulation(s) in order to develop a single list of activities necessary for the learning of a particular objective(s).

1.4.7.4.1 Integrate each teaching strategy with each simulation separately in order to come up with sub-lists.

1.4.7.4.2 Integrate all the above sub-lists into a single list.

1.4.7.5 Keep recycling through the above steps until there is an integrated (teaching strategy and simulation) plan for learning each objective.

1.4.8 Plan for the implementation of the teaching sequence.

1.4.8.1 Review all activities and make any needed changes.

1.4.8.2 Plan how to make decisions with respect to the teaching process as it is being carried out.

1.4.8.3 If possible test the plan for decision making and make any changes needed.

1.4.8.4 Integrate the tested plan for decision making with the reviewed list of activities.

1.4.8.5 Allocate resources to the integrated list of activities and make any changes which are indicated as a result of this allocation.

1.4.9 Implement the teaching sequence.

1.4.10 Evaluate and redesign if necessary.

1.4.11 Integrate the newly prepared methodologist into a larger system of methodological development.

1.4.11.1 The teaching methodologist operationally defines the following concept "Contributing to methodological development."

1.4.11.2 Test the completeness of the above definition

1.4.11.2.1 Consider whether or not any of the following should be included in the definition.

- Training other methodologists.
- Being sent further documentation of the methodology which has been learned.
- Applying the methodology which has been learned.
- Doing conclusion or decision oriented research on the methodology.
- Developing methodologies.
- Disseminating methodologies.

1.4.11.2.2 Have other methodologists define the concept.

1.4.11.2.3 If possible all methodologists working in a particular area should develop a common definition.

1.4.11.2.4 Combine all the above lists into a single definition.

1.4.11.3 Measure the degree to which the newly trained methodologist satisfied the above definition.

1.4.11.4 Identify that part(s) of the definition which the newly prepared methodologist most completely satisfies.

1.4.11.5 The teaching methodologist secures the consent of the newly trained methodologist to contribute to methodological development in that area which the strength is the greatest.

1.4.11.6 The teaching methodologist and the newly trained methodologist develop and implement the plan for the newly trained methodologist contributing to methodological development.

1.5 Negotiate the decision making contract.

1.5.1 Plan the implementation of this step.

1.5.2 Develop a list of potential clients.

1.5.2.1 Identify all those who have needs which the methodology may meet. At this point the methodologist may want to refer to parts of step 1.3 - Disseminate the methodology especially 1.3.3 (Define the class of problems that the methodology solves) and 1.3.4 (Develop a list'

of potential utilizers) -- in order to develop additional rules and procedures for the identification of potential clients.

1.5.2.2 Identify all those who have actively sought out the methodologist for the purpose of having the methodology applied.

1.5.2.3 Identify all those who have been referred to the methodologist as potential clients.

1.5.2.4 Combine all the above lists into a single list of potential clients.

1.5.3 Test the list of clients for completeness.

1.5.3.1 Repeat the dissemination process in part or in full.

1.5.3.2 Consult those for whom the methodology has been applied in the past in order to identify potential clients.

1.5.3.3 Have other methodologists in the same area identify potential clients.

1.5.3.4 Determine if the methodology can logically proceed or follow the application of any other methodology and then consult with those for whom these "other" methodologies have been applied in order to identify potential clients.

1.5.3.5 Consult methodologists in other areas.

1.5.3.6 Perform any other appropriate test(s) of completeness.

1.5.3.7 Develop a single list of potential clients.

1.5.4 Develop a list of criteria on which to choose the most appropriate client(s).

1.5.4.1 Operationally define the concept "A completely successful application of _____methodology. (fill in the name of the appropriate methodology).

1.5.5 Test the list of criteria for completeness.

1.5.5.1 Review all successful and unsuccessful application of the methodology.

1.5.5.2 Review the rationale for the methodology's development.

1.5.5.3 Review the most current version of the methodolgy.

1.5.5.4 Review the product definition of the methodology's purpose.

1.5.5.5 Have other methodologists define the concept.

1.5.5.6 Have other methodologists perform the tests of completeness.

1.5.5.7 Develop a list of concepts that are critical to the successful implementation of any methodology Refer to steps 1.3.5.1 - 1.3.5.2 - 1.3.5.3.

1.5.6 Choose the most appropriate client(s).

1.5.7 Develop a contract statement which will include:

1.5.7.1 The name of the contract decision maker.

1.5.7.2 The area(s) of concern within the methodology will be applied.

1.5.7.3 The decision makers for whom the methodology will be applied. Decision makers should be those individuals who have primary responsibility for meeting needs within the chosen area of concern.

1.5.7.4 The resources to be utilized.

1.5.7.5 The methodology to be employed.

1.5.7.6 The time period within which the work will be done.

1.5.8 Evaluate.

1.6 Plan this application of the methodology.

1.6.1 Create an "application" matrix.

1.6.1.1 Along the top of the matrix place the names of all the decision makers involved in this application

DM #1, DM #2, DM #3, DM #n →

1.6.1.2 Along the side of the matrix place the names of each major process of the methodology to be used.

1 ↓ identify problems

2 ↓ state purpose

3 ↓ conceptualizing the ideal solution

n ↓

the completed skeleton should look like this

	DM #1	DM #2	DM #n
Process #1			
Process #2			
Process #n			

1.6.1.3 Develop each cell of the matrix by reviewing the most recent version of the methodology to determine what setof procedures is most appropriate for that decision maker to accomplish the purpose of that major process.

1.6.1.4 Review the activities developed for each cell to make sure that:

1.6.1.4.1 The activity is within the capabilities of the person who is expected to perform it.

1.6.1.4.2 That the person will have all necessary prequisite resources for performing the activity before is carried out.

1.6.1.4.3 Suitable consequences will be made available once the activity is successfully accomplished.

1.6.1.5 Arrange the activities in each cell in a chronological order.

1.6.2 Arrange the activities of all cells into a single chronological order, allocate resources, and schedule the times and dates when each activity will be carried out. These plans are preliminary and may be changed as a result of the following step.

1.6.3 PLan for decision making.

1.6.3.1 Identify decision makers.

1.6.3.2 Identify decisions to be made by the decision makers.

1.6.3.3 Determine when the decisions are going to be made.

1.6.3.4 Identify/develop the activities which when observed will provide the data needed to make the necessary decisions.

1.6.3.5 Develop plans for observing the activities.

1.6.3.6 Develop plans for reporting the data through observation.

1.6.3.7 Design the process to be used in decision making.

1.6.3.7.1 If the decision maker already has an acceptable process which he/she is presently using then use that process.

1.6.3.7.2 Use decision making methodology long or short form.

1.6.3.7.3 Use meta-methodology to develop an appropriate decision making process.

1.6.3.8 Review the decision making process.

1.6.3.8.1 Can it eliminate any negative effects of the activities it deals with?

1.6.3.8.2 Can it move the activities which it deals with closer to the ideal activity for accomplishing the purpose?

1.6.3.9 Integrate the plans for observation, plans for reporting, and the process for decision making into a cohesive plan for decision making.

1.6.4 Test the plan for decision making by constructing data which indicate satisfactory, unsatisfactory, and grossly deficient performance of an activity and then apply the decision making process to make decisions given the data.

1.6.5 Integrate the tested plan for decision making into the preliminary schedule of activities (1.6.2) making any needed adjustments in the allocation of resources or the scheduling of activities.

1.6.6 Evaluate.

25.

2.0 Perform a needs analysis.

2.1 Plan the implementation of this step.

2.2 Determine the needs which are of concern to the decision maker.

2.3 Define the need which the decision maker is interested in meeting.

2.4 Report the definition of the need to the decision maker.

2.5 Measure the degree to which the definition of the need is being met.

2.6 Report the results of the measurement to the decision maker.

2.7 Evaluate/Redesign.

3.0 Determine a statement of the purpose with respect to the problem area with which this application of the methodology will deal.

3.1 Plan the implementation of this step.

3.2 The decision maker chooses what component(s) of what need(s) are to be met using the methodology.

3.3 If the decision maker chooses to meet a set of need components that cannot be logically combined into a single purpose statement than a separate application matrix is made for this decision maker. The only change in the matrix will be in the labelling of the horizontal axis (1.6.1.2). Instead of containing the names of decision makers it will contain the names of the need components to be met.

3.4 The decision maker determines what is presently known about the need which is to be met by performing any combination of the following tasks:

3.4.1 Read literature which relates to the need.

3.4.2 Talking to people whose work is involved in meeting the need.

3.4.3 Examine actual efforts to meet the need.

3.4.4 Talk to people who are or have been effected or served by efforts to meet the need.

3.4.5 Talk to people who at one time were involved in meeting the need but who have discontinued their involvement.

3.4.6 Think about the need.

3.4.7 Try out tools that already exist for meeting the need.

3.5 If the above analysis indicates that the chosen need represents a very complex problem area then choose a piece of the original need and repeat the previous step for the chosen piece.

3.6 Create a list of purposes that validly express your intentions for meeting the chosen need.

3.7 Choose the most appropriate purpose.

3.8 Test the chosen purpose.

3.8.1 Can the chosen purpose be expanded to include other unfilled needs? If so expand, if not proceed.

3.8.2 Is the purpose trivial? Is it clear that the purpose as stated requires a specific solution? Does the purpose contain sufficient qualifiers (nouns, adjectives, adverbs, phrases and clauses) If the purpose is trivial revise it, until it isn't.

3.8.3 If the purpose is accomplished will it meet the need? If not revise it until it does.

3.8.4 Is the decision maker committed to accomplishing this purpose? If not develop a purpose which will carry the commitment of the decision maker.

3.8.5 Is the purpose ethical?

3.8.5.1 Is the purpose consistent with the methodologists values system?

3.8.5.2 Will the purpose when accomplished promote the general welfare?

3.8.5.3 Revise the purpose until it is ethical with respect to the above standards.

3.8.6 Is the purpose desireable? Will a solution to accomplish this purpose be actually used? If the purpose is not desireable revise it until it is.

3.8.7 Is the purpose definable? Can it be described in terms of directly observable behaviors or states? If not revise it until it is definable.

3.8.8 Is the purpose practical? Can it be accomplished within the available resources? If not revise it until it is practical.

3.8.9 Are existing solutions insufficient? Do any solutions exist that can accomplish the purpose? If there are either, revise the purpose or adopt the existing solution.

3.8.10 If any of the above tests have resulted in a changed purpose than that purpose should be taken through all other tests separately.

3.8.11 Have other people perform any or all of the above tests.

3.8.12 Write out the acceptable purpose.

3.9 Evaluate.

3.8.5 Is the purpose ethical?

3.8.5.1 Is the purpose consistent with the methodologists values system?

3.8.5.2 Will the purpose when accomplished promote the general welfare?

3.8.5.3 Revise the purpose until it is ethical with respect to the above standards.

3.8.6 Is the purpose desireable? Will a solution to accomplish this purpose be actually used? If the purpose is not desireable revise it until it is.

3.8.7 Is the purpose definable? Can it be described in terms of directly observable behaviors or states? If not revise it until it is definable.

3.8.8 Is the purpose practical? Can it be accomplished within the available resources? If not revise it until it is practical.

3.8.9 Are existing solutions insufficient? Do any solutions exist that can accomplish the purpose? If there are either, revise the purpose or adopt the existing solution.

3.8.10 If any of the above tests have resulted in a changed purpose than that purpose should be taken through all other tests separately.

3.8.11 Have other people perform any or all of the above tests.

3.8.12 Write out the acceptable purpose.

3.9 Evaluate.

4.0 Conceptualize the ideal solution.

4.1 Plan the implementation of this step.

4.2 Develop a preliminary list of ideal solutions.

4.2.1 Define the term "ideal solution".

4.2.1.1 Simple method - substitute the following definition. "An ideal solution is one which completely accomplishes a purpose, is designed in a situation where there are no resource restrictions, uses machines for data processing, and uses as little resources as possible.

4.2.1.2 Complex method - have the decision maker operationally define the concept "an ideal solution" and then test the definition for completeness.

4.2.2 Develop a list of solutions consistent with the definition.

4.2.2.1 The methodologist checks the decision makers understanding of the definition of an ideal solution to make sure that the definition is clear.

4.2.2.2 The methodologist asks the decision maker to focus on each part of the definition with respect to the purpose.

4.2.2.3 While the decision maker is focusing the methodologists asks him to respond to the following stimuli. "Write down all solutions to the purpose that are ideal solutions with respect to the piece of the definition on which you are focusing.

4.2.2.4 The above process is repeated for each part of the definitio of an ideal solution.

4.2.2.5 Combine all responses into a single list of ideal solutions.

4.2.2.6 Test the completeness of the list.

4.3 Develop a list of usual solutions.

4.3.1 Develop a list of usual solutions for this purpose.

4.3.1.1 Write down all the ways that you could accomplish this purpose.

4.3.1.2 Write down all the ways that you could fail to accomplish this purpose and then state them positively so that they are ways of accomplishing the purpose.

4.3.1.3 If you were actually accomplishing the purpose what would you be doing.

4.3.1.4 Write down all the unusual ways of accomplishing the purpose.

4.3.1.5 Combine all responses into a single list of solutions.

4.3.1.6 Test this list for completeness.

4.3.2 Develop a list of usual solutions to similar purposes or problems.

4.3.2.1 Develop a list of problems or purposes which are similar to this one.

4.3.2.2 Of the problems identified determine which ones have actually been dealt with by the decision maker and which have not.

4.3.2.3 For the ones which have been actually dealt with complete the following sentences.

4.3.2.3.1 State how you solved the problem if you dealt with it successfully. Can you state any other ways of solving the problem? If so state them.

4.3.2.3.2 State how you failed to solve the problem if you dealt with it unsuccessfully. Can you state any other ways in which you could have failed to solve the problem. If so state them and then make them positive so that they may be considered as ways of solving the problem.

4.3.2.3.3 State any unusual ways in which you could have solved this problem.

4.3.2.4 For the problems that have not been actually dealt with complete the following sentences.

4.3.2.4.1 Write down all the ways in which this problem could be solved.

4.3.2.4.2 Write down and then negate all the ways by which you could have failed to solve the problem.

4.3.2.4.3 Write down what you would be actually doing if you were solving the problem.

4.3.2.4.4 Write down all the unusual ways in which you could solve the problem.

4.3.2.5 Combine all the above responses into a single list.

4.3.2.6 Test the list for completeness.

4.3.3 Develop a list of solutions to problems that have nothing to do with the original problem.

4.3.3.1 Develop a list of problems that have nothing to do with the original problem.

4.3.3.2 For each of the above problems write out all the ways you could solve the problem.

4.3.3.3 For each of the above problems write out all the ways in which you could fail to solve the problem and then state them positively.

4.3.3.4 If you were actually solving the problem write down what you would be doing.

4.3.3.5 Write down all the unusual ways of accomplishing the problem.

4.3.3.6 Combine all the above into a single list.

4.3.3.7 Test the list for completeness.

4.3.4 Combine all the above lists (4.3.1.6 + 4.3.2.5 + 4.3.3.7) into a single list of usual solutions.

4.4 Develop a final list of ideal solutions.

4.4.1 Examine each usual solution in the light of the definition of an ideal solution.

4.4.2 Change each ususal solution so that it is consistent with the definition of an ideal solution.

4.4.3 Combine the results from above with the preliminary list of ideal solutions (4.2.2.6).

4.4.4 Test the above list for completeness using systems logic and any other appropriate test of completeness.

4.5 Choose the most appropriate ideal solution.

4.5.1 Develop the criteria on which the selection will be made.

4.5.1.1 Imagine a hypothetical situation in which your purpose has been completely accomplished and write down everything that you see happening in that situation.

4.5.1.2 Imagine a situation in which you have completely failed in trying to accomplish your purpose

or a situation in which your purpose is completely absent and write down what is happening.

4.5.1.3 Have others perform the above steps for your purpose.

4.5.1.4 Recreate the original situation using the two lists to see if there are any other apsects which you would like to add.

4.5.1.5 Write down all those things that have nothing to do with the accomplishment of your purpose and consider adding them to your list.

4.5.1.6 If you have ever faced problems or purposes which are similar to your present purpose then repeat the above steps for those similar problems or purposes.

4.5.1.7 Repeat the above steps for problems or purposes that have nothing to do with your purpose.

4.5.1.8 Review each criteria which you have developed to determine if it is stated in operational terms. If not repeat the first five steps for each "fuzzy" criteria.

4.5.1.9 Prioritize the list of operational criteria.

4.5.2 Choose the alternatives to be tested.

4.5.2.1 Prioritize the list of alternative ideal solutions.

4.5.2.2 Choose a manageable number of alternatives on which tests will actually be performed.

4.5.3 Prepare the chosen alternatives for testing.

4.5.3.1 Determine the degree of operationalization to which each alternative must be developed before

it can be tested.

4.5.3.2 Develop each alternative to the chosen level of operationalization.

4.5.3.2.1 Develop the parts of the alternative.

4.5.3.2.1.1 Write down all the things that you would need to accomplish the purpose.

4.5.3.2.1.2 Write down all the things that might cause you to fail to accomplish the purpose.

4.5.3.2.1.3 Write down all the things that you would be using if you were actually accomplishing your purpose.

4.5.3.2.1.4 Write down all the unusual things that you might use to accomplish your purpose.

4.5.3.2.1.5 Write down all those things that have nothing to do with acommplishing the purpose.

4.5.3.2.1.6 Test the above list for completeness by repeating the previous steps for similar alternatives in similar problem areas. Use any other activity which the decision (and or methodologist) feels is an appropriate test of completeness.

4.5.3.2.2 Develop the activities of each part.

4.5.3.2.2.1 State the purpose of each part.

4.5.3.2.2.2 Write down all the ways in which that which that you could accomplish the parts purpose.

4.5.3.2.2.3 Write down all the ways in which you could fail to accomplish the part's purpose and then state them positively.

4.5.3.2.2.4 If you were actually accomplishing the part's purpose what would you be doing.

4.5.3.2.2.5 Write down all the unusual ways in which you might accomplish the part's purpose.

4.5.3.2.2.6 Write down all those activities that have nothing to do with your accomplishing the part's purpose.

4.5.3.2.2.7 Test the above list for completeness.

4.5.3.2.2.8 Repeat the above process for each part of each alternative.

4.5.3.2.3 Arrange the activities in a chronological order making sure that each activity is stated procedurely, there is a logical flow from one activity to another and anchoring activities have been stated.

4.5.3.2.4 Prioritize the chronological list of activities.

4.5.4 Choose the activities to be tested.

4.5.4.1 Interface the prioritized list of criteria with the prioritized list of activities for each alternative to be tested.

4.5.4.2 Choose the highest priority activity(ies) in the highest priority criteria(s) for each alternative.

4.5.5 Plan for testing.

4.5.5.1 Identify the levels of reality at which the activity may exist (from thought to full implementation of a completely operational activity.)

4.5.5.2 Choose the level(s) of reality at which to test the activity.

4.5.5.2.1 Choose that level which is closest to complete implementation.

4.5.5.2.2 Choose a series of levels from which a prediction may be developed.

4.5.5.3 State the purpose of testing the activity at the chosen level of reality.

4.5.5.4 Develop alternative types of tests.

4.5.5.5 Choose the test to be implemented.

4.5.5.6 Plan for the implementation of the test.

4.5.5.6.1 Identify the parts of the test.

4.5.5.6.2 Identify the activities of each part.

4.5.5.6.3 Arrange the activities in a chronological order.

4.5.5.6.4 Review the activities and make any needed changes.

4.5.5.6.5 Plan for making decisions once the test is begun.

4.5.5.6.5.1 Identify decision makers.

4.5.5.6.5.2 Identify decisions.

4.5.5.6.5.3 Identify the points in time at which decisions are to be made.

4.5.5.6.5.4 Identify/develop the activities the data on which is to be used in decision making.

4.5.5.6.5.5 Plan for the observation of these activities.

4.5.5.6.5.6 Plan for reporting the data gathered to the decision maker.

4.5.5.6.5.7 Plan how to use the data to make decisions at the decision making points.

4.5.5.6.5.8 Test the decision making plan.

4.5.5.6.5.9 Plan how to combine all data and decisions into one succient summative evaluation statement.

4.5.5.6.5.10 Integrate the plans for observing, reporting, and decision making into one comprehensive plan for decision making.

4.5.6 Implement the plan for testing.

4.5.8 Evaluate.

4.5.8.1 State the results in terms of decisions made and data used and the results of all test activities.

4.5.8.2 Examine the results to determine if the data will allow for the choosing of one of the alternatives as most appropriate.

4.5.8.3 If the choice cannot be made either.

4.5.8.3.1 Repeat the test.

4.5.8.3.2 Carry out further testing.

4.5.8.3.3 Use short form procedures.

4.6 Review the chosen ideal solution.

4.6.1 Inspect the solution to determine if it is developed sufficiently enough so that it can be modified in light of resources that are actually available for its implementation. Such modification would make the ideal solution a feasiable solution. If the ideal is not sufficiently developed then repeat steps 4.5.3.1 + 4.5.3.2.1 at this time. If the ideal is sufficiently developed simply move on.

4.6.2 Examine the internal consistency of the ideal.

4.6.2.1 By inspection:

4.6.2.1.1 Look at each part in relation to every other part to determine if there is any conflict among parts.

4.6.2.1.2 Look at the purpose of each part against the purposes of all the other parts to determine if there is any conflict among purposes.

4.6.2.1.3 Rough out the activities of each part to determine if there are any conflicts among activities.

4.6.2.2 By testing:

4.6.2.2.1 Implement the activities of all parts at some level of reality and monitor any possible negative effects on each other.

4.6.3 Examine the external consistency of the ideal.

4.6.3.1 By inspection.

4.6.3.2 By testing.

4.7 Confirm the ideal solution with the appropriate individuals or groups based on law or policy.

4.8 Evaluate.

.0 Develop the actual sclution.

5.1 Plan the implementation of this step.

5.2 Arrange the parts of the ideal solution into the order in which they will be worked on.

5.3 For the first(next) part state the part's purpose.

5.4 Identify the resources that are actually available to implement this part.

5.5 Develop feasible alternatives to the ideal part.

5.5.1 Write down all the things that you would need to accomplish the purpose of the part.

5.5.2 Write down all the things that if you did not have might cause you to fail to accomplish the purpose of the part.

5.5.3 Write down all the things that you would be actually using if you were accomplishing the part's purpose.

5.5.4 Write down all the unusual things that you might use to accomplish the purpose of the part.

5.5.5 Write down all those things that have nothing to do with your accomplishing the purpose of the part.

5.5.6 Test the above list for completeness.

5.5.6.1 The decision maker and or methodologist develops and implements appropriate tests of completeness.

5.5.6.2 Repeat the above steps for similar parts in similar problem areas.

5.5.6.3 Repeat the above steps for unrelated parts in unrelated problem areas.

5.5.6.4 Analyze the part's purpose using systems logic.

5.5.7 Review each alternative developed above in light of the resources actually available to make sure that the alternative is feasible.

5.6 Choose the most appropriate feasible alternative. (Refer to step 4.5)

5.6.1 Develop the criteria on which the selection will be made. (4.5.1)

5.6.2 Choose the alternatives to be tested. (4.5.2)

5.6.3 Prepare the alternatives chosen for testing by developing the activities of each alternative part. (4.5.3.2.2)

5.6.4 Choose the activities to be tested. (4.5.4)

5.6.5 Plan for testing. (4.5.5)

5.6.6 Implement the plan for testing. (4.5.6)

5.6.7 Evaluate. (4.5.8)

5.7 Repeat the above steps until there is a feasible alternative to each part of the ideal solution.

5.8 Review the feasible solution.

5.8.1 Examine the internal consistency. (4.6.2)

5.8.2 Examine the external consistency. (4.6.3)

5.9 Confirm the feasible solution with the appropriate individuals or groups based on law or policy.

5.10 Evaluate.

Plan the implementation of actual solution.

6.1 Plan the implementation of this step.

6.2 Arrange the parts of the feasible solution into the order in which they will be worked on.

6.3 Choose the first (next) part to be worked on.

6.4 Develop the activities which are necessary for the part to accomplish its purpose.

6.4.1 Write down all the ways that you could accomplish this purpose.

6.4.2 Write down all the ways that you could fail to accomplish this purpose and then state them positively so that they are ways of accomplishing the purpose.

6.4.3 Imagine yourself actually accomplishing the purpose; write down what you are doing.

6.4.4 Write down all the unusual ways of accomplishing the purpose.

6.4.5 Write down all those things that have nothing to do with your accomplishing the purpose and then consider whether or not you want to add them to your list.

6.4.6 Combine all the above responses into a single list of activities.

6.4.7 Test the list for completeness.

6.4.7.1 The methodologist and or decision maker designs and implements appropriate tests of completeness.

6.4.7.2 Develop a list of activities that are necessary to accomplish similar purposes or problems.

6.4.7.2.1 Develop a list of problems or purposes which are similar to this one.

6.4.7.2.2 Of the problems identified determine which ones have actually been dealt with by the decision maker and which have not.

6.4.7.2.3 Complete the following sentences for those problems that have actually been dealt with by the decision maker.

6.4.7.2.3.1 State how you solved the problem if you dealt with it successfully. Can you state any other ways of solving the problem? If so state them.

6.4.7.2.3.2 State how you failed to solve the problem if you dealt with it unsuccessfully. Can you state any other ways in which you could have failed to solve the problem. If so state them and make them positive so that they may be

considered as ways of solving the problem.

6.4.7.2.3.3 State any unusual ways in which you could have solved this problem.

6.4.7.2.4 Complete the following sentences for those problems that have not been actually dealt with.

6.4.7.2.4.1 Write down all the ways in which this problem could be solved.

6.4.7.2.4.2 Write down and then negate all the ways in which you could fail to solve this problem.

6.4.7.2.4.3 Write down what you would be actually doing if you were solving this problem.

6.4.7.2.4.4 Write down all the unusual ways in which you could solve the problem.

6.4.7.2.4.5 Use the above responses to change your original list of activities.

6.4.7.3 Develop a list of activities which are necessary to solve problems that have nothing to do with the original problem.

6.4.7.3.1 Develop a list of problems that have nothing to do with the original problem.

6.4.7.3.2 For each of the above problems write out all the ways that you could solve the problem.

6.4.7.3.3 For each of the above problems write out all the ways in which you could fail to solve the problem and then state them positively.

6.4.7.3.4 Write out what you would be doing if you were actually solving this problem.

6.4.7.3.5 Write down all the unusual ways of solving this problem.

6.4.7.3.6 Use the above responses to change your original list of activities.

6.5 Review the activities.

6.5.1 Arrange the activities in a chronological order.

6.5.2 Examine each activity separately.

6.5.2.1 Determine the degree to which each activity is operationally defined. If it is fuzzy define it making sure that the resultant components are stated procedurely. Make any needed changes in the chronological list.

6.5.2.2 Determine if each activity is appropriate. (Within the person's present knowledge, capability and skill.)

6.5.2.2.1 State who is going to be performing the activity.

6.5.2.2.2 Identify a behavior presently existing in that persons repetoire that is identical or similar to the expected activity.

6.5.2.2.3 Plan for the observation of that activity.

6.5.2.2.4 Plan for the reporting of the data collected.

6.5.2.2.5 Integrate and implement the above two plans.

6.5.2.2.6 Review the results in order to determine if the expected behavior is appropriate. If the behavior is inappropriate either.

6.5.2.2.6.1 Drop the activity as an expectation.

6.5.2.2.6.2 Identify another person who is capable of performing the activity.

6.5.2.2.6.3 Change the activity so that it is in line with the individuals present knowledge, capability and skill.

6.5.2.2.6.4 Identify a prerequisite activity which when established will remedy the deficiency.

6.5.2.2.7 Make any necessary changes in the chronological list.

6.5.2.3 Review each activity in light of the resources that are needed to carry it out.

6.5.2.3.1 Select the method of identification.

6.5.2.3.1.1 Directly observe the person performing the activity.

6.5.2.3.1.2 Ask yourself.

6.5.2.3.1.3 Ask others.

6.5.2.3.1.4 Ask the person who is involved in the activity.

6.5.2.3.1.5 Directly observe others performing the activity.

6.5.2.3.1.6 Directly observe the products of others who have performed the activity.

6.5.2.3.1.7 Read literature.

6.5.2.3.1.8 Some combination of the above.

6.5.2.3.1.9 Any other appropriate method of identification.

6.5.2.3.2 Using the selected method of identification answer the following questions.

6.5.2.3.2.1 What would the who require to carry out the activity?

6.5.2.3.2.2 If the who had failed to carry out the activity what would they be missing?

6.5.2.3.2.3 If the who were actually carrying out the activity what would they be using?

6.5.2.3.2.4 What unusual things could be used by the who to carry out the activity?

6.5.2.3.2.5 What things have nothing to do with the who carrying out the activity?

6.5.2.3.2.6 Combine the above lists into one list.

6.5.2.3.3 Test the above list for completeness.

6.5.2.3.3.1 The methodologist and or decision maker develops and implements

appropriate tests of completeness.

6.5.2.3.3.2 Use another mode of identification.

6.5.2.3.3.3 Answer the above questions for similar activities.

6.5.2.3.3.4 Answer the above questions for completely unrelated activities.

6.5.2.3.4 Choose the most appropriate and the most critical prerequisite resources.

6.5.2.3.5 Review the chosen list of reources to determine if they will be available at the time the activity is called for. If there is any doubt that these critical prerequisite resources will be available add to the chronological list of activities other activities which are designed to acquire the needed resources.

6.5.2.4 Identify appropriate consequences which are to follow the successful completion of each activity.

6.5.2.4.1 Determine whether or not consequences are needed by answering the following questions:

6.5.2.4.1.1 Is the activity already highly desireable to the person involved?

6.5.2.4.1.2 Is the person already performing the activity frequently?

6.5.2.4.1.3 If your answer to either of the above questions is yes. than consequences are not needed. If your answer is no then procede

through the rest of this step until an appropriate consequence is identified.

6.5.2.4.2. Choose the most appropriate type of consequence.

6.5.2.4.2.1 Success and simple movement to the next activity.

6.5.2.4.2.2 Social interactions (Talking to others, praise, constructive criticism from supervisor or peers, being touched or hugged, etc.)

6.5.2.4.2.3 Activities. (Taking or teaching courses, independent study programs, playing tennis, etc.)

6.5.2.4.2.4 Tokens (money, points, chips, etc.)

6.5.2.4.2.5 Others not listed.

6.5.2.4.3 If success is chosen then the activity should be recycled through 6.5.2.1 + 6.5.2.2 and 6.5.2.3 until the chance of failure has been eliminated.

6.5.2.4.4 If any other type of consequence has been chosen then the following steps should be performed.

6.5.2.4.4.1 Select the method of identifying alternative consequences within the chosen consequence category (6.5.2.3.1).

6.5.2.4.4.2 Develop an exhaustive list of alternative consequences within the chosen consequence category.

6.5.2.4.4.3 Choose the most appropriate consequence using the following criteria.

- Effectiveness in maintaining the activity (desireability to the person involved)
- Cost.
- Consequences on the environment (disruption or unsettling effects on yourself and others.
- Any other appropriate criteria

6.5.2.4.5 Determine if there are activities to acquire/develop and administer the chosen consequence. If there are none develop them and add them to the chronological list of activities.

6.5.2.5 Repeat the above steps for each activity.

6.5.3 Examine the whole list of activities to make sure that there is a logical flow from one activity to another.

6.5.4 Examine the first and last activities on the chronological list to determine whether or not they are in fact the first and last (anchoring) activities.

6.5.5 Look at each activity against its parts purpose and determine if any other activities could/should be added in order to maximize the accomplishment of the part's purpose.

6.5.6 Review the internal consistency of the activities for part.

6.5.6.1 By inspection.

6.5.6.2 By testing.

6.5.7 Review the external consistency of the activities.

6.5.7.1 By inspection.

6.5.7.1 By testing.

6.5.8 Make any needed changes in the list of activities based on the review.

6.6 Develop the activities which are necessary for the solution to accomplish its purpose.

6.6.1 Repeat the above steps for each part. (Recycle to 6.3.)

6.6.2 Integrate the activities of each part into a single list of activities.

6.7 Allocate resources to the activities and confirm the allocation. Make any needed changes in the allocation.

6.8 Plan for decision making.

6.8.1 Identify the decision makers.

6.8.2 Identify the decisions that are to be made by the decision makers.

6.8.3 Determine when the decisions are going to be made.

6.8.4 Identify/develop the activities which when observed will provide the data needed to make the necessary decisions.

6.8.5 Develop plans for observing the activities.

6.8.6 Develop plans for reporting the data gathered through observation.

6.8.7 Design the process to be used in decision making.

6.8.7.1 If the decision maker already has an acceptable process which he/she is presently using, then use that process.

6.8.7.2 Use decision making methodology long or short forms.

6.8.7.3 Use meta-methodology to develop an appropriate decision making process.

6.8.8 Review the decision making process.

6.8.8.1 Can the process eliminate any negative effects of the activities it deals with?

6.8.8.2 Can the process move the activities it deals with closer the ideal activity for accomplishing the purpose.

6.8.9 Integrate the plans for observation, plans for reporting, and the decision making process into a single cohesive plan for decision making.

6.8.10 Test the plan for decision making by constructing data which indicate satisfactory, unsatisfactory, and grossly deficient performance of an activity and then apply the decision making process to make decisions given the data.

6.8.11 Integrate the tested plan for decision making into the list of activities (6.6) for accomplishing the purpose.

6.9 Evaluate.

7.0 Implement the solution.

7.1 Plan the implementation of this step.

7.2 Carry out the activities in the order specified and within the resources allocated to each activity. Use the plan for decision making to make any decisions necessary with respect to the implementation of the solution.

7.3 Evaluate.

8.0 Evaluate.

8.1 Plan the implementation of this step.

8.2 Return to step 4.5.1 where the criteria for an acceptable solution were generated and make a list of these criteria.

8.3 Compile all data provided at the decision making points.

8.4 Review each component in light of the data provided to determine the extent to which each component has been met.

8.5 Determine how many of the components have been satisfactorily met (completeness).

8.6 Determine if the highest priority components have been satisfactorily met (focus).

8.7 Determine the number of the planned activities that were actually implemented (efficiency).

8.8 If the degree of efficiency focus or completeness is unsatisfactory determine the cause.

8.8.1 The solution was poorly implemented.

8.8.2 The solution (activities and or plan for decision making) was poorly developed.

8.8.3 The major parts of the actual solution were poorly designed.

8.8.4 The ideal solution was incorrectly conceptualized.

8.8.5 The purpose was pporly stated.

8.8.6 The needs analysis was inadequate.

8.8.7 The preparation for the utilization of the methodology was inadequate in:

8.8.7.1 Planning the application of the methodology.

8.8.7.2 Negotiating the contract.

8.8.7.3 Preparing the methodologist.

8.8.7.4 Disseminating the methdology.

8.8.7.5 Developing a current version of the methodlogy.

8.8.7.6 Identifying the readers frame of reference.

8.9 Present the results of 8.5 - 8.8 to the temporary decision maker to determine if a reapplication of the methodology is desired or called for.

8.10 If warranted reapply the methodology making the changes indicated in 8.8.

8.11 Evaluate.

- APPENDIX FOUR

DISSEMINATION METHODOLOGY

Dissemination Methodology

urpose: To meet needs through the dissemination of products

Case I: The dissemination is working for a product developer (a special case--the disseminator is the product developer)

Case II: The disseminator is working as an independent change agent (i.e., his remuneration would come from something like a university salary; dissemination is not his only major concern; rather, one of a number of interests)

Case III: The disseminator is working for a funded agency whose function is to disseminate products (For example, the Far West Laboratory for Educational Research & Development)

Case IV: The disseminator is working for a consumer or group of consumers. (e.g., a school system)

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CASE I

. Find a product developer who will employ the methodologist in the dissemination of his product

A. Determine the resources (e.g., time, money, etc.) available for this step

B. Determine the kinds of products the methodologist wants to disseminate. (It is important to explain that the methodology is not meant, as are many "Madison Avenue" type methods to "create" desire and then fill it with products that people could well do without. It is important that the disseminator believes his product to be worth disseminating.)

C. Find a product developer who has such a product (It is important to note here that, while a "product" will often be hardware, which is sold for money, it does not have to be; it could be something like a research report, with the "product developer" being the person who has conducted the research; it could simply be any new idea.)

1. Read literature dealing with this and related products

2. Talk to people who work with this or related products or have knowledge of them

D. Explain the purpose and merits of the methodology to the product developer

(It will be necessary to do a "selling" job, particularly if the product developer is not familiar with the notion of methodology.)

1. Be as thoroughly familiar with the methodology as possible

2. Establish a professional level (as opposed to personal level) of rapport with the product developer

   a. Observe common rules of courtesy carefully (punctuality, politeness, etc.)

   b. Remain as honest and objective as possible at all times

   c. Be as knowledgeable as possible about the product developer's product

   d. Make your interest in his/her product known

   e. Explain fully the methodology; including the purpose and steps, and what the payoff would be for the product developer and the disseminator

E. If the product developer accepts the methodology and will employ the methodologist, go to Step II. If not, return to Step I.C. (to find another product developer.)

I. Negotiate a contract with the product developer
(The disseminator should explain in writing just exactly what kinds of services he will be providing, and the product developer should accept it, also in writing; this prevents future possible misunderstanding.)

A. If not done in Step I.D., explain each major step in the methodology to the product developer. If this causes the product develcper to reject the methodology, return to Step I.C.

B. Identify the product to be disseminated
(In many instances, the product will be very specifically defined right from the beginning. In other cases, the product developer may be interested in seeing that, say, the idea of individualized instruction be disseminated. In this case, "individualized instruction" will have to be operationalized, i.e., what exactly will the school be doing--in observable behaviors--when it is making use of individualized instruction. Unless the exact nature of the product is specified, itwill be impossible to observe whether or not it has been successfully disseminated; in fact, the disseminator will not know exactly what he should be disseminating. "Operationalization of Fuzzy Concepts" can be a useful tool in this step.)

C. Identify what will satisfy the product developer's defini- of "adoption"
(Products, particularly complex products, are either not adopted completely or are adopted with some changes. It will be necessary to see what the product developer will settle for in terms of "adoption".)

1. Break the product down into component parts

2. Determine which of these parts must be used, and without any adaptation, in order that the product developer be satisfied.

As a test of completeness (if necessary):

3. Determine all ways in which the product can be partially adopted

4. Determine which, if any, of these are acceptable to the product developer

D. Identify, if possible, the resources available for the dissemination effort (Resources can include a great variety of things - e.g., money, time, physical facilities, hardware, assist personel, etc.--anything the product developer is willing to supply that will be of some assistance in the dissemination effort.)

1. If the product developer is unwilling to commit resources without seeing more specifically what the resources will buy, develop, as far as possible, specific strategies possible within the methodology that use different quantities of resources. (The product developer may be unwilling to commit any specific quantity of resources until he sees several specific, alternate tactics that can be used and that require different levels of resources. Since it is the product developer's money that is being spent, he does have a right to choose among alternatives as he wishes--although the disseminator should keep all of the alternatives in harmony with the methodology.

   This step is particularly necessary if the product developer does not know too much about dissemination. It is also a problem now because the methodology is at a stage where much more operationali_ation is necessary. As the methodology becomes more operational, this step should become less necessary).

   a. Determine at least the general aspects of a strategy that could be used, and follows the methodology, on a low budget (say, $5000 or less)

   b. Determine at least the general aspects of a strategy that could be used, and follows the methodology, on an intermediate budget (say $5000 - $50,000)

c. Determine at least the general aspects of a strategy that could be used, and follows the methodology, on a high budget (say, over $50,000)

2. Present the options to the product developer and ask him to commit himself, to one of the options.

E. Prepare the contract and secure the product developer's final approval (one clause in the contract should permit the product developer to discontinue use of the methodology any time he chooses to do so. His/her cooperation is needed at a number of points for a successful application of the methodology; it is senseless to proceed without it.)

Plan the implementation of the remaining steps in the methodology. (In order to insure a systematic application of the methodology, the disseminator must, at this point, plan how the resources will be spent in accordance with the contract. It is determined here just how much of the total resources will be allocated to each step; in addition, approximate time schedules for the completion of each step should be drawn up.)

Have the product developer design--or adapt, if the product is already designed--the product to be as amenable to dissemination as possible, without changing the character of the product. (Obviously, some products can be changed more than others without compromising their integrity; it is important that they be adapted, if possible, as indicated below; it is equally important that their basic character not be altered)

A. Determine the resources available for this step.

B. Make an initial judgement as to what general populations will benefit from the adoption of the product and have the resources necessary to adopt it. (This will be, when properly expanded, a short version of Step IV.)

It is important to note here that it is most basic that the dissemination of product be done to meet needs, and not simply to disseminate the product, at least so far as the methodology is concerned. It does not allow for "over-selling" the product, whatever motivation for that sort of thing might be.)

C. Make the product as compatible with the potential adopter's values, culture, and/or traditions as possible (This will reduce the trauma sometimes associated with adopting a new product, and generally make the transition from old to new easier.)

1. Determine whether or not the product is by nature adaptable to a variety of values, cultures, traditions, and/or practices. If so, go to Step II. If not, go to D.

2. Determine the values, culture, and/or traditions of the potential adopters as they would affect or be affected by the product.

a. Read available literature on values, culture, and/or traditions that are of concern.

b. Discuss v/c/t/ of concern with at least a few (say, 3) leading experts whose field(s) might be affected by the product.

c. Sample opinions (interview, questionnair; etc.) about relevant v/c/t from members of the target population themselves.

d. If resources are quite large, other relevant research can be conducted (e.g., to determine whether a particular value/set of values is/are held by most of the target population.

3. Adapt the product to the values, culture, and/or traditions of the potential adopters as much as possible.

D. Keep the cost of the product as low as possible (For obvious reasons)

1. If product costs nothing or almost nothing (e.g., a research report advocating some variety of behavior change), move to Step III,E.

2. Break the product down into component parts if possible

3. Determine which of the components are essential to the product if it is to accomplish the purpose for which it was designed.

4. Eliminate those components found to be non-essential in Step 3.

5. Continue to break down the components until it is relatively easy to determine the lowest possible cost for each. The total will then be the lowest possible cost for the product.

6. Document cost information for use in Step VI.

E. Reduce the complexity of the product as much as possible.

1. Steps III.D.2. through III.D.4. will have yielded components of the product. If the components are broken down as far as possible, go to Step III.

2. Break down the components into their most basic sub-components.

3. If necessary, provide explanation of the final list of components of the product.

4. Document complexity information for use in Step VI

Make the product "divisible", so that it can be tried initially on a small scale.
(The idea being that a potential adopter does not have to risk a large change that may or may not work out for him; he can try it on a small scale first. Any such breakdown will obviously have to be done in consultation with the product developer.)

1. Determine whether the product is divisible or can be made divisible without sacrificing its ability to accomplish its purpose. If it is not, or cannot be made divisible, go to Step III.G.

2.. Determine how the product can be tried on a limited basis.

   a. Determine whether only part of the product need be tried in order to try the concept behind the product.

   b. Determine whether only a part of the adopting population (given that it is made up of more than one person) needs to try the product to give it a fair trial

   c. Document all possible ways the product can be made divisible for use in Step VI.

Make the product observable, if possible, so that a potential adopter can see it in operation before he makes his decision.

1. Determine whether any institutions already use the product

2. Determine whether the product developer or the disseminator can demonstrate the product.

3. Determine the existence of concrete evidence of the success of the product in observation (e.g., written results of tests of its effectiveness, testimonials from users of the product, etc. This can be a good substitute if the product is not directly observable, and often a valuavle supplement even if it is.)

4.. Document observability for use in Step VI.

If possible, try to design/adapt the product to make its positive effects as visible as possible and/or suggest possible measurement techniques to determine the effectiveness of the product.
(If the product's benefits are completely "intangible", there is less likelihood that its adoption will be permanent. It is important that its positive impact be somehow demonstrable. This is a problem of particular importance in education.)

Determine problems that could be encountered by those adopting the product and plan ways to counteract them.

1. If the product is already in use somewhere, determine the difficulties encountered by those who are using it.

2. If no population is using the product, examine problems encountered by those who have encountered similar products.

3. Talk with at least a few experts in the area which the product is designed to have an effect.

4. Sample opinions from the target population as to what problems they feel they would encounter in using the product.

5. If necessary, revise the product based on the information received from Steps 1-4.

   a. If necessary and possible, change some of the existing features of the product

   b. If necessary and possible, devise support services that can be added to the product.
   (The adopter may encounter some difficulty in using the product, even though his enthusiasm for it is genuine. Since the goal is to meet the need, and the product can meet the need only if it is properly used, the product developer should make available, within existing resources, support services that will help the adopter make best use of the product and prevent discouragement, especially during the early stages of use.)

Determine those groups to be designated as "potential adopters."

1. Determine the resources available for this step.

3. Ask the product developer whose needs for the product--according to which person or group--he is interested in.
(This may be a bit confusing as it is stated here. For example, he may be interested in schools' need for his product according to him, in which he simply decides whether the schools need it or not. He may decide on the schools' needs for his product according to some other expert, in which case he is relying on that expert to determine whether the expert thinks that schools need his product. He may decide on schools' need for the product according to school personnel, in which case school personnel are surveyed. Or, he may decide that he simply does not know all the populations who can use his product, and wants to leave that kind of population analysis to the disseminator or some members of a dissemination team)

   1. If the product developer chooses to decide the population and define the need himself, go to Step VI.B.3.

2. If the product developer names some other party to decide the population and/or the need, ask the designated person to specify the population and the need, and go to Step VI.B.3.

3. If the product developer wishes to leave determination of potential populations and need to the disseminator(s), go to the beginning of Step VI.

Identify general populations that will benefit from the adoption of the product (potential adopters)

A. Determine the resources available for this step

B. Identify general populations that have a need for the product.

1. Determine all populations that could possibly have a need for the product.

a. Read the relevant literature

b. Talk with people whose work is in related areas

c. Brainstorm all possible general populations

2. Determine if the general populations identified in Step IV.B.L. actually need the product.

a. Read relevant literature on these populations

b. Talk with experts on these populations

c. Sample opinions from the populations themselves

d. Conduct relevant research on these populations

3. Compile a list of populations that are identified as needing the product

C. Among these populations, if the population is large, identify those sub-populations for whom the product fills a high pri-
fills a high-priority need.
(The rationale being that people will expend resources first on things they need most; also, with this step included, the methodologist is committed to filling greater rather than lesser needs. Also, if the number of populations listed in V.B.3. are relatively small, V.C. constitutes a waste of resources, or at least very often will; more time is spent determining whether the need is high-priority than would be spent disseminating the product to all identified populations.)

1. Implement the needs analysis methodology, using at least a sample of the target sub-population

2. Determine whether or not the need the product fills has a sufficiently high priority on the needs of the population;

if it does, go to Step IV.D.; if not, select another sub-population and implement needs analysis again.

D. Of these, determine those populations for whom the product would have a high relative advantage over what is currently being used, if anything.

E. Of these, identify, as far as possible, those sub-populations on whom the product would have seriously detrimental side effects, and leave them out of the dissemination effort. (Often products disseminated heedlessly result is far more harm than good being done for the target population.)

1. If the resources are relatively small, make judgement from existing relevant knowledge.

   a. Brainstorm possible side effects

   b. Talk to people knowledgeable about those sub-populations

   c. Real relavant literature on those subpopulations

   d. Sample opinions from the sub-population

2. If resources are relatively large, conduct a field test of the product on a sample of the target sub-population

F. The above steps will result in a set of potential adopters who will be the target population; if it is different from the group identified in Step III.B., consider whether or not you need to recycle from Step III.C. on.

Identify, among the designated potential adopters, those sub-groups most likely to react favorably to the product and focus communication upon them.

A. Determine the resources available for this step.

B. Identify, within the population, the target audiences (on whom the product is designed to have an effect), the decision audiences (who decide on adoption/rejection), and the adoption audiences (who actually use the innovation). The concern in steps C, D, and E will be decision audiences. (These concepts may be a bit confusing. Often, all three audiences are the same, but the following should illustrate how they can be different. Superintendents may decide to adopt a new PSSC Physics course, teachers use the new materials, which are designed to have an effect on students.) (Terms from Rogers and Svenning, 1967).

C. Determine those in the decision audiences who are the early adopters.

1. Identify products used by the target population similar to the product to be disseminated

2. Determine those in target population who have a record of early adoption of those products

   a. Examine available records of adoption of those products

   b. Talk with those who use those products

   c. Talk with those connected with the adoption of those products

   d. Talk with the developers of those products

3. Compile a list of those identified as "early adopters".

). If resources are relatively large, and if there are a relatively large number of early adopters, determine the opinion leaders among the early adopters. If not, go to Step V.D.

1. Use other sociometric devices to identify opinion leaders (e.g., questionnaires that ask, "name the three colleagues from whom you would be most apt to seek advice with regard to (whatever the nature of the product is)"

2. If the disseminator has insufficient expertise in interpreting sociometric devices (if sophisticated sociometric devices are in fact used), employ an appropriate consultant

3. Compile a final list of those members of the target population to be the first at whom dissemination efforts will be directed

E. Develop a professional level (as opposed to friendship level) of rapport with the potential adopter identified in Step V.B.4. or Step V.C.3.
(It is important to establish free, two-way discussion of the product; it is equally important not to come on like an insurance salesman.)

1. Observe common rules of courtesy carefully (punctuality, politeness, etc.)

2. Remain honest and as objective as possible at all times

3. Be aware of the potential adopter's professional activities, or the activities of his/her institution

4. Make your interest (if genuine) in his/her activities or those of his/her institution known to the potential adopter

5. Explain clearly to the potential adopter that your intent... is to disseminate the product only to meet needs. If he/she does not see that it meets a need, you are not interested in disseminating the product to him/her

6. Explain fully your role in disseminating the product

7. Be able to explain readily any aspect of the product

?. Explain the product fully, and describe how it will meet the potential adopter's needs.
(It is important not to "oversell" here--the disseminator must be well-versed on the product's qualities and the potential adopter's needs, and he must remain objective.)

1. If appropriate,and especially if there is a presentation being made to a group, a multimedia presentation is likely to be more effective.
(Not as trivial as it may seem)

2. Explain your perception of the potential adopter's needs (or the needs of his/her system). If the potential adopter's diagnosis, and if the potential adopter and the disseminator cannot reach an agreement on needs, go to another potential adopter. Otherwise, proceed to Step 2.

3. Explain your perception of what the total impact of the product will be on the potential adopter's system

   a. Explain how you think it will meet need(s)

   b. Explain what negative effects may result

4. Explain the characteristics of the product that were determined/developed in Step IV.
(It is important to emphasize that these characteristics be accurately portrayed; do not exaggerate or overempha-

   a. Explain the cost of the product

   b. Explain how the product can be observed in use (if it can)

   c. Explain how the product can be tried on a limited basis (if it can)

   d. Explain its compatibility with the cultures, values, and traditions of the potential adopter (if it is, in fact, compatible)

   e. Explain the support services available for use if the product is adopted

5. If the potential adopter's reaction is favorable, and if the decision population is different from the adopting and/or target population, suggest that the other (two) population(s) be given at least some role in the final decision.

   a. Explain the advantage: that the adoption is most likely to be permanent if all those concerned with the adoption feel as though they have some part in

the final decision.

b. Offer to make presentations (preferably separate, so that they can be tailored to the audience(s) and to the other population(s).

c. If the person(s) who will make the final decision refuse the offer, go to Step VII. If they accept, proceed to the next step (VI.F.6.)

6. Determine the level of sophistication of the various audiences to whom you will be making presentations (i.e., how much do they know about this and/or related products?)

7. If possible, determine the level of apprehansion the audience(s) has (have) with regard to this and/or similar products.

8. Tailor the presentation to the sophistication/knowledge/apprehension level of the audience and make the presentation(s)
(For example, students might be more fearful of a programed learning text than would teachers or administrators; the approach with students would be geared more to the emotional end of the spectrum (try to generate interest and allay fears). Teachers and administrators would probably be less fearful and more apt to be convinced by hard facts than by general agruments.

It shoud be noted that the core of the presentation should be an explanation of how the product meets an identified, recognized need.)

If the potential adopter(s) decide(s) to adopt, make the products available to him/her as soon as possible, including all available support services if they are desired.

If resources for this step remain, implement the "2-step model", i.e., help the opinion leaders disseminate the product to others in the population.

A. Determine whether the opinion leader wants to help in the dissemination effort.

B. Determine whether the opinion leader is to be trusted with the resources available for this step. If not, go to Step VII.

C. Determine how much and what kinds of resources the opinion leader needs.

D. Make the resources available to the opinion leader.
(It is important--if the opinion leader is granted trust--that he be given a free hand, within resource limitations. Opinion leaders, by definition, exert a natural influence over the rest of the population. The natural process should not be interfered with any more than absolutely necessary.)

Evaluate the results of the adoption/rejection; the Fortune-Hutchinson evaluation methodology can be used

A. The product developer is the decision-maker.

B. If adopted, evaluate its acceptance, use, and impact, including the future dissemination of the product.)

1. If it meets the adopter's need, proceed with other potential adopters in the same manner--i.e., return to Step IV.

2. If it does not meet the need, or for some other reason causes trouble for the adopter, return to Step III.

C. If rejected, evaluate reason(s) for rejection and return to Step ~~III~~ IV or V, as the product developer decides (i.e., he may choose either to redesign his product or to aim the existing product at a different target population).

Proceed through Step IV - ~~VII~~ X until the product is completely disseminated, or until resources run out.

Evaluate the success of the methodology and revise where appropriate.

A. Determine the extent to which the product was successfully disseminated
(Several criteria can be used, depending partially on the nature of the dissemination effort.

1. Cost-benefit criteria

a. Determine resources spent in disseminating the product

b. Determine the number of people or groups who have adopted the product

c. Compare a.and b.

2. Extent to which the product is disseminated

a. Determine the number of possible adopters contacted

b. Determine the number of people/groups adopting

c. Compare a.and b.
(This can be a problem. The nature of innovation adoption is such that it is slow at first, then rapidly accelerating, and finally slowing down again. Diffusion of any innovation can take considerable time, making evaluation of the effort difficult.)

3. Extent to which needs are met.

4. A combination of the above, or some other criteria agreeable both to disseminator and product developer.

APPENDIX FIVE

NEEDS SENTENCES GENERATED DURING THE FIELD TEST

1. Other program directors' needs for changes in attitude from deficit trainers to assest seekers according to Scottie Torres.

2. Other program directors' needs for changes in attitude from deficit trainers to assest seekers according to Bob Jackson.

3. Other program directors' needs for changes in attitude from deficit trainers to assest seekers according to Kathy McArdle.

4. Other program directors' needs for changes in attitude from deficit trainers to assest seekers according to Frank Schorn.

5. Other program directors' needs for changes in attitude from deficit trainers to assest seekers according to Jane Miller.

6. Other program directors' needs for understanding the scope and depth of the undergraduate program in special education according to Scottie Torres.

7. Other program directors' needs for understanding the scope and depth of the undergraduate program in special education according to Bob Jackson.

8. Other program directors' needs for understanding the scope and depth of the undergraduate program in special education according to Kathy McArdle.

9. Other program directors' needs for understanding the scope and depth of the undergraduate program in special education according to Frank Schorn.

10. Other program directors' needs for understanding the scope and depth of the undergraduate program in special education according to Jane Miller.

11. Other program directors' needs for supportive services from interns according to Scottie Torres.

12. Other program directors' needs for supportive services from interns according to Bob Jackson.

13. Other program directors' needs for supportive services from interns according to Kathy McArdle.

14. Other program directors' needs for supportive services from interns according to Frank Schorn.

15. Other program directors' needs for supportive services from interns according to Jane Miller.

16. Other program directors' needs for establishing funding contacts according to Scottie Torres.

17. Other program directors' needs for establishing funding contacts according to Bob Jackson.

18. Other program directors' needs for establishing funding contacts according to Kathy McArdle.

19. Other program directors' needs for establishing funding contacts according to Frank Schorn.

20. Other program directors' needs for establishing funding contacts according to Jane Miller.

21. Other program directors' needs for evaluation according to Scottie Torres.

22. Other program directors' needs for evaluation according to Bob Jackson.

23. Other program directors' needs for evaluation according to Kathy McArdle.

24. Other program directors' needs for evaluation according to Frank Schorn.

25. Other program directors' needs for evaluation according to Jane Miller.

26. Students' in elementary education needs for changes in attitude from deficit trainers to assest seekers according to Scottie Torres.

27. Students' in elementary education needs for changes in attitude from deficit trainers to assest seekers according to Bob Jackson.

28. Students' in elementary education needs for changes in attitude from deficit trainers to assest seekers according to Kathy McArdle.

29. Students' in elementary education needs for changes in attitude from deficit trainers to assest seekers according to Frank Schorn.

30. Students' in elementary education needs for changes in attitude from deficit trainers to assest seekers according to Jane Miller.

31. Students' in elementary education needs for understanding the scope and depth of the undergraduate program in special education according to Scottie Torres.

32. Students' in elementary education needs for understanding the scope and depth of the undergraduate program in special education according to Bob Jackson.

33. Students' in elementary education needs for understanding the scope and depth of the undergraduate program in special education according to Kathy McArdle.

34. Students' in elementary education needs for understanding the scope and depth of the undergraduate program in special education according to Frank Schorn.

35. Students' in elementary education needs for understanding the scope and depth of the undergraduate program in special education according to Jane Miller.

36. Students' in elementary education needs for supportive services from interns according to Scottie Torres.

37. Students' in elementary education needs for supportive services from interns according to Bob Jackson.

38. Students' in elementary education needs for supportive services from interns according to Kathy McArdle.

39. Students' in elementary education needs for supportive services from interns according to Frank Schorn.

40. Students' in elementary education needs for supportive services from interns according to Jane Miller.

41. Students' in elementary education needs for establishing funding contacts according to Scottie Torres.

42. Students' in elementary education needs for establishing funding contacts according to Bob Jackson.

43. Students' in elementary education needs for establishing funding contacts according to Kathy McArdle.

44. Students' in elementary education needs for establishing funding contacts according to Frank Schorn.

45. Students' in elementary education needs for establishing funding contacts according to Jane Miller.

46. Students' in elementary education needs for evaluation according to Scottie Torres.

47. Students' in elementary education needs for evaluation according to Bob Jackson.

48. Students' in elementary education needs for evaluation according to Kathy McArdle.

49. Students' in elementary education needs for evaluation according to Frank Schorn.

50. Students' in elementary education needs for evaluation according to Jane Miller.

51. Teachers' in the field needs for changes in attitude from deficit trainers to assest seekers according to Scottie Torres.

52. Teachers' in the field needs for changes in attitude from deficit trainers to assest seekers according to Bob Jackson.

53. Teachers' in the field needs for changes in attitude from deficit trainers to assest seekers according to Kathy McArdle.

54. Teachers' in the field needs for changes in attitude from deficit trainers to assest seekers according to Frank Schorn.

55. Teachers' in the field needs for changes in attitude from deficit trainers to assest seekers according to Jane Miller.

56. Teachers' in the field needs for understanding the scope and depth of the undergraduate program in special education according to Scottie Torres.

57. Teachers' in the field needs for understanding the scope and depth of the undergraduate program in special education according to Bob Jackson.

58. Teachers' in the field needs for understanding the scope and depth of the undergraduate program in special education according to Kathy McArdle.

59. Teachers' in the field needs for understanding the scope and depth of the undergraduate program in special education according to Frank Schorn.

60. Teachers' in the field needs for understanding the scope and depth of the undergraduate program in special education according to Jane Miller.

61. Teachers' in the field needs for supportive services from interns according to Scottie Torres.

62. Teachers' in the field needs for supportive services from interns according to Bob Jackson.

63. Teachers' in the field needs for supportive services from interns according to Kathy McArdle.

64. Teachers' in the field needs for supportive services from interns according to Frank Schorn.

65. Teachers' in the field needs for supportive services from interns according to Jane Miller.

66. Teachers' in the field needs for establishing funding contacts according to Scottie Torres.

67. Teachers' in the field needs for establishing funding contacts according to Bob Jackson.

68. Teachers' in the field needs for establishing funding contacts according to Kathy McArdle.

69. Teachers' in the field needs for establishing funding contacts according to Frank Schorn.

70. Teachers' in the field needs for establishing funding contacts according to Jane Miller.

71. Teachers' in the field needs for evaluation according to Scottie Torres.

72. Teachers' in the field needs for evaluation according to Bob Jackson.

73. Teachers' in the field needs for evaluation according to Kathy McArdle.

74. Teachers' in the field needs for evaluation according to Frank Schorn.

75. Teachers' in the field needs for evaluation according to Jane Miller.

76. Special education students' needs for changes in attitude from deficit trainers to assest seekers according to Scottie Torres.

77. Special education students' needs for changes in attitude from deficit trainers to assest seekers according to Bob Jackson.

78. Special education students' needs for changes in attitude from deficit trainers to assest seekers according to Kathy McArdle.

79. Special education students' needs for changes in attitude from deficit trainers to assest seekers according to Frank Schorn.

80. Special education students' needs for changes in attitude from deficit trainers to assest seekers according to Jane Miller.

81. Special education students' needs for understanding the scope and depth of the undergraduate program in special education according to Scottie Torres.

82. Special education students' needs for understanding the scope and depth of the undergraduate program in special education according to Bob Jackson.

83. Special education students' needs for understanding the scope and depth of the undergraduate program in special education according to Kathy McArdle.

84. Special education students' needs for understanding the scope and depth of the undergraduate program in special education according to Frank Schorn.

85. Special education students' needs for understanding the scope and depth of the undergraduate program in special education according to Jane Miller.

86. Special education students' needs for supportive services from interns according to Scottie Torres.

87. Special education students' needs for supportive services from interns according to Bob Jackson.

88. Special education students' needs for supportive services from interns according to Kathy McArdle.

89. Special education students' needs for supportive services from interns according to Frank Schorn.

90. Special education students' needs for supportive services from interns according to Jane Miller.

91. Special education students' needs for establishing funding contacts according to Scottie Torres.

92. Special education students' needs for establishing funding contacts according to Bob Jackson.

93. Special education students' needs for establishing funding contacts according to Kathy McArdle.

94. Special education students' needs for establishing funding contacts according to Frank Schorn.

95. Special education students' needs for establishing funding contacts according to Jane Miller.

96. Special education students' needs for evaluation according to Scottie Torres.

97. Special education students' needs for evaluation according to Bob Jackson.

98. Special education students' needs for evaluation according to Kathy McArdle.

99. Special education students' needs for evaluation according to Frank Schorn.

100. Special education students' needs for evaluation according to Jane Miller.

101. Kathy McArdle's need for changes in attitude from deficit trainer to assest seeker according to Scottie Torres.

102. Kathy McArdle's need for changes in attitude from deficit trainer to assest seeker according to Bob Jackson.

103. Kathy McArdle's need for changes in attitude from deficit trainer to assest seeker according to Kathy McArdle.

104. Kathy McArdle's need for changes in attitude from deficit trainer to assest seeker according to Frank Schorn.

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106. Kathy McArdle's need for understanding the scope and depth of the undergraduate program in special education according to Scottie Torres.

107. Kathy McArdle's need for understanding the scope and depth of the undergraduate program in special education according to Bob Jackson.

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109. Kathy McArdle's need for understanding the scope and depth of the undergraduate program in special education according to Frank Schorn.

110. Kathy McArdle's need for understanding the scope and depth of the undergraduate program in special education according to Jane Miller.

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112. Kathy McArdle's need for supportive services from interns according to Bob Jackson.

113. Kathy McArdle's need for supportive services from interns according to Kathy McArdle.

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115. Kathy McArdle's need for supportive services from interns according to Jane Miller.

116. Kathy McArdle's need for establishing funding contacts according to Scottie Torres.

117. Kathy McArdle's need for establishing funding contacts according to Bob Jackson.

118. Kathy McArdle's need for establishing funding contacts according to Kathy McArdle.

119. Kathy McArdle's need for establishing funding contacts according to Frank Schorn.

120. Kathy McArdle's need for establishing funding contacts according to Jane Miller.

121. Kathy McArdle's need for evaluation according to Scottie Torres.

122. Kathy McArdle's need for evaluation according to Bob Jackson.

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124. Kathy McArdle's need for evaluation according to Frank Schorn.

125. Kathy McArdle's need for evaluation according to Jane Miller.

126. Jane Miller's need for changes in attitude from deficit trainer to assest seeker according to Scottie Torres.

127. Jane Miller's need for changes in attitude from deficit trainer to assest seeker according to Bob Jackson.

128. Jane Miller's need for changes in attitude from deficit trainer to assest seeker according to Kathy McArdle.

129. Jane Miller's need for changes in attitude from deficit trainer to assest seeker according to Frank Schorn.

130. Jane Miller's need for changes in attitude from deficit trainer to assest seeker according to Jane Miller.

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132. Jane Miller's need for understanding the scope and depth of the undergraduate program in special education according to Bob Jackson.

133. Jane Miller's need for understanding the scope and depth of the undergraduate program in special education according to Kathy McArdle.

134. Jane Miller's need for understanding the scope and depth of the undergraduate program in special education according to Frank Schorn.

135. Jane Miller's need for understanding the scope and depth of the undergraduate program in special education according to Jane Miller.

136. Jane Miller's need for supportive services from interns according to Scottie Torres.

137. Jane Miller's need for supportive services from interns according to Bob Jackson.

138. Jane Miller's need for supportive services from interns according to Kathy McArdle.

139. Jane Miller's need for supportive services from interns according to Frank Schorn.

140. Jane Miller's need for supportive services from interns according to Jane Miller.

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142. Jane Miller's need for establishing funding contacts according to Bob Jackson.

143. Jane Miller's need for establishing funding contacts according to Kathy McArdle.

144. Jane Miller's need for establishing funding contacts according to Frank Schorn.

145. Jane Miller's need for establishing funding contacts according to Jane Miller.

146. Jane Miller's need for evaluation according to Scottie Torres.

147. Jane Miller's need for evaluation according to Bob Jackson.

148. Jane Miller's need for evaluation according to Kathy McArdle.

149. Jane Miller's need for evaluation according to Frank Schorn.

150. Jane Miller's need for evaluation according to Jane Miller.

151. Bob Jackson's need for changes in attitude from deficit trainers to assest seekers according to Scottie Torres.

152. Bob Jackson's need for changes in attitude from deficit trainers to assest seekers according to Bob Jackson.

153. Bob Jackson's need for changes in attitude from deficit trainers to assest seekers according to Kathy McArdle.

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159. Bob Jackson's need for understanding the depth and scope of the undergraduate program in special education according to Frank Schorn.

160. Bob Jackson's need for understanding the depth and scope of the undergraduate program in special education according the Jane Miller.

161. Bob Jackson's need for supportive services from interns according to Scottie Torres.

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169. Bob Jackson's need for establishing funding contacts according to Frank Schorn.

170. Bob Jackson's need for establishing funding contacts according to Jane Miller.

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173. Bob Jackson's need for evaluation according to Kathy McArdle.

174. Bob Jackson's need for evaluation according to Frank Schorn.

175. Bob Jackson's need for evaluation according to Jane Miller.

APPENDIX SIX

VERSION IV OF DECISION MAKING METHODOLOGY

0.0 Purpose: To make decisions that are optional with respect to the desires of a decision maker.

1.0 Prepare for the utilization of the methodology.

1.1 The reader is asked to determine his/her frame of reference by identifying which of the following groups that he or she belongs to.

1.1.1 A person who is interested in learning a methodology but who has no substantial experience in methodologies. In this case the reader should proceed to step 1.4.4.4.6 (Preparing the methodologist.)

1.1.2 A person who is interested in having a methodology applied for them in order to solve some problem. In this case the reader should proceed to step 1.5.2.2 (Negotiate the contract.)

1.1.3 A person who has some substantial experience in methodologies. In this case the reader should

1.1.3.1 State the experience that the reader has in methodologies

1.1.3.2 State the purpose that the reader has in dealing with this methodology

1.1.3.3 Cycle to the step(s) that best accomplish the reader's purpose.

1.2 Develop a current version of the methodology. (This step may be performed anywhere in the utilization of a methodology. It is included here in order to highlight the desirability of developing a current version of a methodology prior to any

substantial effort to utilize it through teaching, application or dissemination.)

1.2.1 Plan the implementation of this step.

1.2.2 Choose the methodology to be developed.

1.2.2.1 Determine the resources available for selection.

1.2.2.2 If the resources are large go to 1.2.2.3. If the resources are small go to 1.2.2.4.

1.2.2.3 Use the Coffing Client Demand Methodology to select the methodology to be developed.

1.2.2.4 Use the interests of the methodologist to determine the methodology to be developed.

1.2.3 Identify those who have had the type of contact with the most recent version of the methodology that will most likely result in the identification of gaps.

1.2.3.1 List the ways in which one may have contact with the methodology.

1.2.3.2 Choose the way that has the highest probability of uncovering gaps.

1.2.3.3 Identify as many of those who have used the most recent version of the methodology in the above way as possible.

1.2.3.4 Test the completeness of this list.

1.2.3.5 From this list choose the most appropriate past utilizer(s).

1.2.3.5.1 Identify the criteria on which the selection will be made. One may consider such criteria as the knowledge and experience of the past utilizer or the scope and rigor of the utilization.

1.2.3.5.2 Measure the past utilizer(s) against each of the criteria.

1.2.3.5.3 Select the past utilizer who has the highest rating and with whom the methodologist has not already worked.

1.2.3.5.4 Make sure that the methodologist is committed to working with the selected utilizer.

1.2.3.5.5 Confirm the past utilizer selected with any individual or group whom the methodologist chooses based on preference, law, or policy.

1.2.4 Prepare for interacting with the past utilizer.

1.2.4.1 Develop a brief explanation of why the past utilizer is being contacted and how he/she and the methodologist might work together.

1.2.4.2 Identify and confirm a time when the methodologist can discuss the above information with the past utilizer.

1.2.4.3 Meet with the past utilizer to determine if his/her cooperation can be secured. If so proceed to the next step. If not determine the problem and make a judgment as to whether or not the problem can be solved practically. If it can, do so; if not cycle back to 1.2.3.5.3 and choose another past utilizer.

1.2.4.4 Develop a plan for interacting with the past utilizer. This plan should be specific with respect to the resources to be used and the activities to which these resources are to be allocated.

1.2.5 Identify gaps found in the methodology by the past utilizers.

1.2.5.1 Implement the plan for identifying gaps with a particular past utilizer.

1.2.5.2 Cycle back to 1.2.3.5.3 and identify the next past utilizer with whom gaps are to be identified and repeat the previous steps with that past utilizer.

1.2.5.3 Repeat the above steps until the methodologist has worked with as many of the past utilizers as possible given the available resources.

1.2.5.4 Compile a single list of gaps.

1.2.5.5 Test the completeness of the list of gaps.

1.2.5.5.1 Gather test of completeness data by performing any one or combination of the following tasks.

1.2.5.5.1.1 Read the most recent version of the methodology to identify gaps.

1.2.5.5.1.2 Have other methodologists review the most recent version of the methodology.

1.2.5.5.1.3 Have others who are experienced in the problem that the methodology is designed to solve read the most recent version of the methodology in order to identify gaps.

1.2.5.5.1.4 Consult others who have had contact with earlier versions of the methodology.

1.2.5.5.2 Review the test of completeness data and make any changes in the original list of gaps that may seem appropriate.

1.2.6 Select the gaps to be filled.

1.2.6.1 Operationalize the purpose of the methodology.

1.2.6.2 Review the resources available for selecting

gaps and the number of gaps that have been identified. If both the resources and the number of gaps are large go to step 1.2.6.4. If the number of gaps and/or the amount of resources are small go to 1.2.6.3.

1.2.6.3 Select the first gap that is both difficult to fill and critical according to the operationalized definition of the methodology's purpose.

1.2.6.4 Divide the gaps into categories.

1.2.6.4.1 Review each gap and make the following determinations:

1.2.6.4.1.1 Is the gap critical?

1.2.6.4.1.2 Is the gap difficult to fill?

1.2.6.4.2 Organize the gaps into the following categories:

1.2.6.4.2.1 Gaps that are both critical and difficult to fill.

1.2.6.4.2.2 Gaps that are critical but not difficult to fill.

1.2.6.4.2.3 Gaps that are difficult to fill but which are not critical.

1.2.6.4.2.4 Gaps that are both not critical and not difficult to fill.

1.2.6.4.3 Prioritize the gaps within the first/next category.

1.2.6.4.4 Review this prioritization in light of the gaps in the next category to see if any changes should be made.

1.2.6.4.5 Choose the highest priority gap.

1.2.7 Further develop the methodology by filling the most critical unfilled gaps.

1.2.8 Evaluate the implementation of this major step.

1.2.9 Cycle back to step 1.1 and use the procedures of that step to decide what if any additional contact the methodologist may want to have with the methodology he/she has just worked on.

1.3 Disseminate the methodology.

1.3.1 Plan the implementation of this step.

1.3.2 Choose the methodology to be disseminated.

1.3.2.1 Simple method - use the interests of the methodologist.

1.3.2.2 Complex method - use the Coffing client demand methodology.

1.3.3 Define the class of problems that the methodology is capable of solving.

1.3.3.1 Develop a list of all the needs which the methodology can/does fulfill.

1.3.3.2 Test this list for completeness by doing any combination of the following.

1.3.3.2.1 Ask other methodologists to identify the needs which the methodology can/does fulfill.

1.3.3.2.2 Review the methodology's rationale in order to identify needs that it meets.

1.3.3.2.3 Review any logs of the application of the methodology in order to identify needs that it meets.

1.3.3.2.4 Determine what needs are met by each major process of the methodology.

1.3.3.2.5 Compile a list of needs met by tools similar to the methodology.

1.3.3.2.6 Compile a list of needs met by methodologies which are similar to the one being disseminated.

1.3.3.2.7 Combine all lists into one list of needs.

1.3.4 Develop a list of potential utilizers of the methodology.

1.3.4.1 For each of the above needs determine who has the need.

1.3.4.2 Test this list for completeness by doing any combination of the following things.

1.3.4.2.1 Read literature, talk to people, and examine work being done with respect to the methodology which is being disseminated.

1.3.4.2.2 Analyze the implications of the methodology's purpose with respect to identifying potential utilizers.

1.3.4.2.3 State the purpose that the methodologist has in disseminating the methodology and then analyze the implications of that purpose so as to identify potential utilizers.

1.3.4.2.4 Repeat steps 1.2.2 and 1.2.3 in the "Develop a current version of the methodology" step.

1.3.4.2.5 Identify all those who have actively sought out the methodologist with respect to learning the methodology or having it applied.

1.3.4.2.6 Combine all the above lists into a single list of potential utilizers of the methodology.

1.3.5 Identify the most appropriate potential utilizer.

1.3.5.1 Develop a list of concepts which are critical to the utilization of any methodology.

1.3.5.2 Test the completeness of the above list by doing any combination of the following tasks.

1.3.5.2.1 Review the original list to see if any of the following concepts should by included.

- class of problems
- well defined purpose
- definition of a methodology
- decision maker validity

1.3.5.2.2 Review successful and unsuccessful applications of the methodology in order to determine critical concepts.

1.3.5.2.3 Review the rationale for the development of the methodology.

1.3.5.2.4 Have other methodologists repeat the above steps.

1.3.5.2.5 Combine all the above lists into a single list of critical concepts.

1.3.5.3 Choose the concepts to be worked with.

1.3.5.3.1 State the purpose that the methodologist has in disseminating the methodology (this may have already been done in step 1.3.4.2.3).

1.3.5.3.2 Operationally define the purpose of dissemination.

1.3.5.3.3 Choose the concept(s) that most completely satisfy the definition of the dissemination purpose.

1.3.5.4 Operationally define the chosen concepts.

1.3.5.5 Plan for the distribution of the concept's definition to the potential utilizers.

1.3.5.6 Plan how to determine the desirability of the definition to the potential utilizers.

1.3.5.7 Integrate the above two plans into a single plan.

1.3.5.8 Implement the above plan.

1.3.5.9 Remove from the list of potential utilizers all those for whom the critical concepts are undesirable.

1.3.6 Determine the degree to which the methodology being disseminated will solve the problems of the potential utilizer.

1.3.6.1 Have the potential utilizer test the purpose of the methodology against the criteria for an acceptable purpose as found in meta-methodology.

1.3.6.2 If the purpose is unacceptable either:

1.3.6.2.1 Stop work and refer the potential utilizer to other solutions which may solve the problem.

1.3.6.2.2 Develop a purpose which is acceptable and then build a methodology that will accomplish this purpose.

1.3.6.2.3 Refer the potential utilizers to another methodology.

1.3.6.3 Operationally define the purpose of the methodology in terms of process and product. If at this point you choose to further develop the methodology recycle to step 1.2 (Develop a current version of the methodology).

1.3.6.4 Prioritize the components of the definition.

1.3.6.5 Determine the problems faced by the potential utilizer which the methodology is capable of solving.

1.3.6.6 Choose the problem which the methodology will be applied to.

1.3.6.7 Operationally define the chosen problem.

1.3.6.8 Prioritize the operational components of the chosen problem.

1.3.6.9 Interface the definition of the problem with the definition of the methodology in order to create a list of all possible tests of the methodology relative to solving the chosen problem. (Refer to the goals/parts interface step in evaluation methodology.)

1.3.6.10 Choose the test(s) to be performed.

1.3.6.11 Develop a plan for carrying out the plan.

1.3.6.12 Implement the plan.

1.3.6.13 Repeat the above three steps until either the resources run out or until the potential utilizer thinks that there is enough data present to decide whether or not the methodology can solve the problem.

1.3.6.14 Review the results of testing by asking the potential utilizer the following questions. "Is there any critical part of your problem that definitely cannot be met by the methodology?"

1.3.6.15 If the answer to the above question is yes then either:

1.3.6.15.1 Stop work and refer the potential utilizer to other solutions.

1.3.6.15.2 Carry out additional testing.

1.3.6.15.3 Refer the potential utilizer to another methodology.

1.3.6.15.4 Build another methodology.

1.3.7 Plan for the utilization of the methodology.

1.3.7.1 Cycle to "prepare the methodologist" if the utilizer wants to learn the methodology.

1.3.7.2 Cycle to "contract negotiation" if the utilizer wants the methodology to be applied to solve a problem.

1.3.7.3 Cycle to "develop a current version of the methodology" if the utilizer wants to further develop the methodology.

1.3.7.4 Cycle to any task of the potential utilizers choosing.

1.3.8 Evaluate.

1.4 Prepare the methodologist.

1.4.1 Plan the application of this step.

1.4.2 Choose the methodology to be taught.

1.4.3 Develop a current version of the methodology (Refer to step 1.2 Develop a current version of the methodology.)

1.4.4 Inform the general public as to the nature and existence of the methodology.

1.4.4.1 Develop a short description of the methodology.

1.4.4.2 Develop a plan for distributing this description to as large an audience as possible. This audience should be diversified with respect to such factors as age, vocation, sex, and ethnic identity. The distribution plan should contain provisions for providing additional information about the methodology should such information be requested. The distribution plan should also contain provisions by which one may inform the methodologist of his/her interest in the methodology.

1.4.4.3 Implement the plan and monitor positive and negative reactions to the methodology.

1.4.5 Select the group to whom the methodology will be taught.

1.4.5.1 State the purpose that the methodologist has in teaching this particular methodology.

1.4.5.2 Test this purpose against the criteria for an acceptable purpose as documented in meta-methodology and revise if necessary.

1.4.5.3 Develop a list of potential methodologists by analyzing the implications of the teaching purpose.

1.4.5.3.1 Complete the following sentence. "I could accomplish my teaching purpose by teaching the methodology to _____."

1.4.5.3.2 Complete the following sentence. "I could fail to accomplish my teaching purpose if I did not teach the methodology to _____."

1.4.5.3.3 Complete the following sentence. "If I were actually accomplishing my teaching purpose I would be teaching the methodology to _____."

1.4.5.3.4 Combine your responses to the above three sentences into a single list of potential methodologists.

1.4.5.4 Test the completeness of the above list by doing any combination of the following tasks.

1.4.5.4.1 Think up all the possible alternatives to each potential methodologist.

1.4.5.4.2 Think up all those people who have nothing to do with your purpose in teaching the methodology.

1.4.5.4.3 Develop a list of all those who have or who are interested in learning other methodologies and then consider if they might be interested in learning this particular methodology.

1.4.5.4.4 Repeat appropriate parts of 1.2.2 (1.2.2.2 + 1.2.2.4) and 1.2.3.

1.4.5.4.5 Repeat appropriate parts of 1.3.3 and 1.3.4.

1.4.5.4.6 Add to your list any individual or group who has actively sought out the methodologist for the purpose of learning the methodology.

1.4.5.5 Operationally define the teaching purpose.

1.4.5.6 Choose that group of potential methodologists that most completely satisfies the defined teaching purpose. At this point the methodologist may want to refer to steps 1.3.5 and 1.3.6 in order to identify additional criteria

and procedures which may be used in the selection of the learning group.

1.4.5.7 Each member of the chosen learning group confirms their intention of learning the methodology.

1.4.6 Determine the needs of the learning group.

1.4.6.1 The methodologist decides whether to teach the group as a group or as individuals.

1.4.6.2 The methodologist identifies the group's/individual's area of application by obtaining answers to the following questions.

1.4.6.2.1 Are you learning the methodology so that you may solve a particular problem? If so identify that problem.

1.4.6.2.2 Are you learning the methodology so that you may solve an as of yet unspecified problem? If so identify the area in which the problem is found.

1.4.6.2.3 Are you learning the methodology just out of general interest? If so develop a statement which will accurately describe your interest in the methodology.

1.4.6.3 Determine what the group/individuals need to know with respect to implementing the methodology in their particular area of application (Refer to the Coffing/Hutchinson Needs Analysis Methodology.)

1.4.6.4 Choose the learning need(s) to be worked on and develop the sequence in which they will be taught.

1.4.7 Develop a teaching purpose which is specific with respect to the needs of this particular learning group.

1.4.7.1 Investigate the area of the chosen learning need(s).

1.4.7.2 Combine the results of the above analysis with the results of the needs analysis in order to state a teaching purpose which is specific with respect to this particular learning group.

1.4.7.3 Test the teaching purpose. (Refer to meta-methodology Step III.)

1.4.7.4 If necessary revise the purpose until it is acceptable.

1.4.8 Develop the teaching sequence.

1.4.8.1 Develop a sequenced series of learning objectives.

1.4.8.1.1 Analyze the implications of the teaching purpose by completing the following sentences.

1.4.8.1.1.1 I could accomplish the teaching purpose if the group learned _____.

1.4.8.1.1.2 I would fail to accomplish the teaching purpose if the group did not learn _____.

1.4.8.1.1.3 If I were actually accomplishing the teaching purpose the group would be learning _____.

1.4.8.1.1.4 Combine your answers to each of the above sentences into a single list of learning objectives.

1.4.8.1.2 Test the above list for completeness.

1.4.8.1.3 Sequence of the tested list of learning objectives.

1.4.8.2 Develop a strategy to teach each one of the sequenced learning objectives.

1.4.8.2.1 Choose the first (next) learning objective for which a teaching strategy is to be developed.

1.4.8.2.2 State the purpose of the chosen learning objective.

1.4.8.2.3 Develop an exhaustive set of alternative plans for teaching the objective by analyzing the implications of the objective's purpose. In developing the list consider such alternative teaching strategies as simulations, lectures, discussions, and demonstrations.

1.4.8.2.4 Choose the alternative to be implemented.

1.4.8.2.5 Plan for the implementation of the chosen alternative. If the alternative chosen is a simulation develop the details of the simulation through the use of instructional simulation design methodology.

1.4.8.2.6 If possible field test the planned teaching strategy.

1.4.8.2.7 Repeat the above process for each objective or move on once a single

teaching strategy has been developed for a single objective.

1.4.8.3 Keep recycling through the above steps until there is an integrated (teaching strategy and simulation) plan for learning each objective.

1.4.9 Plan for the implementation of the teaching sequence.

1.4.9.1 Review all activities and make any needed changes.

1.4.9.2 Plan how to make decisions with respect to the teaching process as it is being carried out.

1.4.9.3 If possible test the plan for decision making and make any changes needed.

1.4.9.4 Integrate the tested plan for decision making with the reviewed list of activities.

1.4.9.5 Allocate resources to the integrated list of activities and make any changes which are indicated as a result of this allocation.

1.4.10 Implement the teaching sequence.

1.4.11 Evaluate and redesign if necessary.

1.4.12 Integrate the newly prepared methodologist into a larger system of methodological development.

1.4.12.1 The Teaching methodologist operationally defines the following concept "Contributing to methodological development."

1.4.12.2 Test the completeness of the above definition.

1.4.12.2.1 Consider whether or not any of the following should be included in the definition.

- Training other methodologists.
- Being sent further documentation of the methodology which has been learned.
- Applying the methodology which has been learned.
- Doing conclusion or decision oriented research on the methodology.
- Developing methodologies.
- Disseminating methodologies.

1.4.12.2.2 Have other methodologists define the concept.

1.4.12.2.3 If possible all methodologists working in a particular area should develop a common definition.

1.4.12.2.4 Combine all the above lists into a single definition.

1.4.12.3 Measure the degree to which the newly trained methodologist satisfied the above definition.

1.4.12.4 Identify that part(s) of the definition which the newly prepared methodologist most completely satisfies.

1.4.12.5 The teaching methodologist secures the consent of the newly trained methodologist to contribute to methodological development in that area which the strength is the greatest.

1.4.12.6 The teaching methodologist and the newly trained methodologist develop and implement the plan for the newly trained methodologist contributing to methodological development.

1.5 Negotiate the decision making contract.

1.5.1 Plan the implementation of this step.

1.5.2 Inform the general public as to the nature and existence of the methodology.

1.5.2.1 Develop a short description of the methodology.

1.5.2.2 Develop a plan for distributing this description to as large an audience as possible. This audience should be diversified with respect to such factors as age, vocation, sex, and ethnic identity. The distribution plan should contain provisions for providing additional information about the methodology should such information be requested. The distribution plan should also contain provisions by which one may inform the methodologist of his/her interest in the methodology.

1.5.2.3 Implement the plan and monitor positive and negative reactions to the methodology.

1.5.3 Develop a list of potential clients.

1.5.3.1 Identify all those who have needs which the methodology may meet. At this point the methodologist may want to refer to parts of step 1.3 - Disseminate the methodology, especially 1.3.3 (Define the class of problems that the methodology solves) and 1.3.4 (Develop a list of potential utilizers) -- in order to develop additional rules and procedures for the identification of potential clients.

1.5.3.2 Identify all those who have actively sought out the methodologist for the purpose of having the methodology applied.

1.5.3.3 Identify all those who have been referred to the methodologist as potential clients.

1.5.3.4 Combine all the above lists into a single list of potential clients.

1.5.4 Test the list of clients for completeness.

1.5.4.1 Repeat the dissemination process in part or full.

1.5.4.2 Consult those for whom the methodology has been applied in the past in order to identify potential clients.

1.5.4.3 Have other methodologists in the same area identify potential clients.

1.5.4.4 Determine if the methodology can logically proceed or follow the application of any other methodology and then consult with those for whom these "other" methodologies have been applied in order to identify potential clients.

1.5.4.5 Consult methodologists in other areas.

1.5.4.6 Perform any other appropriate test(s) of completeness.

1.5.4.7 Develop a single list of potential clients.

1.5.5 Develop a list of criteria on which to choose the most appropriate client(s).

1.5.5.1 Operationally define the concept "A completely successful application of _____ methodology. (Fill in the name of the appropriate methodology.)

1.5.6 Test the list of criteria for completeness.

1.5.6.1 Review all successful and unsuccessful applications of the methodology.

1.5.6.2 Review the rationale for the methodology's development.

1.5.6.3 Review the most current version of the methodology.

1.5.6.4 Review the product definition of the methodology's purpose.

1.5.6.5 Have other methodologists define the concept.

1.5.6.6 Have other methodologists perform the tests of completeness.

1.5.6.7 Develop a list of concepts that are critical to the successful implementation of any methodology. Refer to steps 1.3.5.1 - 1.3.5.2 - 1.3.5.3.

1.5.7 Choose the most appropriate client(s).

1.5.8 Gather the information necessary to develop a contract statement.

1.5.8.1 The name of the contract decision maker.

1.5.8.2 The problem area in which the contract decision maker wants to make decisions.

1.5.8.3 The specific dates of the contracting period.

1.5.8.4 The names of any other decision makers for whom the contract decision maker would like to see the methodology applied and who make decisions with respect to the problem area.

1.5.8.5 The resources that will be available for this application of the methodology.

1.5.8.6 The amount of resources to be allocated to each decision maker.

1.5.8.6.1 Prioritize the decision makers.

1.5.8.6.2 Allocate the resources for this application of the methodology among the decision makers according to their priority.

1.5.8.6.3 Allocate the resources for each decision maker among the major processes of the methodology.

1.5.8.7 Review the resource allocation.

1.5.8.7.1 Ask the contract decision maker to examine the allocation and make any adjustments that he/she believes are necessary.

1.5.8.7.2 Explain to the contract decision maker the contingencies under which the terms of the contract may be altered. One such contingency would be a decrease in the available resources of the magnitude that required a change from long form procedures to short form procedures.

1.5.8.7.3 Ask each decision maker to confirm his/her willingness to work with the methodologist. Also have each decision maker confirm his/her ability to supply the resources that the contract decision maker has said that they could supply. Any problems regarding the commitment or resources of any decision maker should be communicated to the contract decision maker.

1.5.8.7.4 Explain to each decision maker the contingencies under which the terms of the contract may be altered.

1.5.8.7.5 Determine when each decision maker including the contract decision maker will be available during the contracting period.

1.5.9 Develop a formal or informal contract statement using the above information.

1.5.10 Confirm the contract statement with appropriate individuals chosen on the basis of either the preference of the contract decision maker or on the laws or policies that govern the actions of the contract decision maker.

1.5.11 The contract decision maker approves the contract statement.

1.5.12 Evaluate the effectiveness of this major step.

1.5.13 Choose the highest priority decision maker who is available to implement the next major step.

1.6 Plan this application of the methodology.

1.6.1 Plan the implementation of this step.

1.6.2 Cycle to major process 2.0 and use the steps of that process to identify the problems that the decision maker would like to solve during this application of the methodology.

1.6.3 Allocate the resources available for implementing the methodology to the problems that have been identified.

1.6.4 Divide the resources that have been allocated to each problem among the major processes of the methodology.

1.6.5 Develop a time table for implementing the methodology.

1.6.5.1 Choose the first/next problem for which a time table is to be developed.

1.6.5.2 Determine when the solution to that problem can/should be implemented.

1.6.5.2.1 Identify the resources that have been allocated to the implementation of the solution.

1.6.5.2.2 Determine the earliest possible date at which the decision maker can begin to implement the solution.

1.6.5.2.3 Determine the latest possible date at which the implementation of the solution will have to be completed.

1.6.5.2.4 Identify those periods of time between these two dates during which the decision maker can provide the resources that have been allocated to the implementation of the solution.

1.6.5.2.5 If more than one period is identified choose the one that the decision maker believes is most appropriate. This is a preliminary choice and may by changed as the details of the solution are developed.

1.6.5.2.6 Review the chosen period for conflict with critical activities that the decision maker may be involved in at that time. These activities may or may not be related to the implementation of the methodology.

1.6.5.3 Determine when each major process that needs to be carried out prior to the implementation of the solution can/should be carried out.

1.6.5.3.1 Choose the major process to be worked with. This major process should be the one that is either closest to the implementation of the solution or closest to the beginning of the last major process whose implementation has been planned.

1.6.5.3.2 Identify the resources that have been allocated to the implementation of this major process.

1.6.5.3.3 Have the decision maker identify that section of the contracting period during which he/she can provide the above resources. This section should be as close as possible to the beginning of the last major process that has been planned for.

1.6.5.3.4 Review the chosen period for conflict with critical activities that the decision maker may be involved in at that time. These activities may or may not be related to the implementation of the methodology.

1.6.5.3.5 Recycle to 1.6.5.3.1 and repeat the last four steps until the implementation of each of the methodology's major processes has been planned.

1.6.5.3.6 Have the decision maker review the overall plan for implementing the methodology for this problem.

1.6.5.4 Determine when the effectiveness of the solution can be evaluated.

1.6.5.4.1 Identify the resources that are available for evaluation and redesign.

1.6.5.4.2 Determine the earliest date at which the implementation of the solution will most likely be finished.

1.6.5.4.3 Determine the latest date at which the decision maker will be available during the contracting period.

1.6.5.4.4 Determine periods of time between these two dates during which the

decision maker can provide the resources that have been allocated to evaluation and redesign.

1.6.5.4.5 If more than one period is identified have the decision maker choose the one that he/she believes is most appropriate. The period chosen should be as close as possible to the date on which the implementation of the solution will be completed, and as far as possible from the end of the contracting period so as to allow for any needed redesign.

1.6.5.4.6 Review the chosen period for possible conflict with critical activities that the decision maker may be involved in at that time. These activities may or may not be related to the implementation of the methodology.

1.6.5.5 Record the information generated in the last three steps into a time table for working with the decision maker on this particular problem.

1.6.5.6 Recycle to 1.6.5.1 and repeat the above steps for the rest of the problems that the decision maker would like to work on during this application of the methodology.

1.6.5.7 Integrate the above information into a single plan which states at what times during the contracting period the decision maker will be available to implement each of the methodology's major processes for each of the problems that he/she is concerned about solving from within the problem area.

1.6.5.7.1 Divide the contracting period into sub-periods.

1.6.5.7.2 Choose the first/next sub-period.

1.6.5.7.3 Determine all the work that has been planned during that sub-period.

1.6.5.7.4 Total the amount of resources that this work will require.

1.6.5.7.5 Recycle to 1.6.5.7.2 and repeat the last two steps for each sub-period from within the contracting period.

1.6.5.7.6 Present the above information to the decision maker and have the decision maker review it to make sure that the resources that have been agreed upon will actually be available at the times in question.

1.6.5.8 Ask the decision maker if he/she would like any other individuals or groups to examine or critique the overall plan. If so identify

these people and present the plan to them for their critique. Communicate the results of this critique to the decision maker and ask the decision maker to make any corrections that he/she believes are necessary.

1.6.5.9 Confirm the above plan with the contract decision maker.

1.6.6 Evaluate the effectiveness of this major step.

1.6.7 Choose the next piece of work to be done.

1.6.7.1 Determine the decision makers that are available at this time.

1.6.7.2 Choose the highest priority decision maker.

1.6.7.3 Confirm the availability of this decision maker.

1.6.7.4 If steps 1.6.1 through 1.6.6 have been carried out with the decision maker then a plan for implementing the methodology for that decision maker will have been developed. In this case the methodologist should review the plan and compile a list of options as to those sections of the methodology that can be carried out with the decision maker at this time. If steps 1.6.1 through 1.6.6 have not been carried out then they should be implemented at this time.

1.6.7.5 Meet with the decision maker and present the options that are available as to the work that

can be done at this time. Stress that an absolutely complete list of options is not being presented; therefore the decision maker should feel free to suggest any other options that he/she believes are appropriate.

1.6.7.6 Have the decision maker choose the option that he/she believes is most appropriate.

1.6.7.7 Cycle to the planning step of the major process that contains the option chosen.

2.0 Identify problems. The following procedures are a short form version of the Coffing, Hutchinson Needs Analysis Methodology (1973). If resources permit the long form of these procedures should be used:

2.1 Plan the implementation of this major process.

2.1.1 Determine the resources that are available for implementing this major step.

2.1.2 Allocate these resources among the steps of this major process according to the following percentages.

50% to step 2.2

15% to step 2.3

30% to step 2.4

5% to steps 2.5 through 2.8

2.1.3 Confirm this allocation with the decision maker for whom this major process is to be applied.

2.1.4 Proceed to step 2.2.

2.2 Determine the decision maker's concerns about who needs what according to whom with respect to the problem area of this application.

2.2.1 The methodologist asks the decision maker to write in a list his/her responses to the question, "Who are the individuals or groups involved in this problem area whose needs are important to you?"

2.2.2 The methodologist asks the decision maker to write in a list his/her responses to the question, "For these persons or groups what kinds of needs are important to you?"

2.2.3 The methodologist asks the decision maker to write in a list his/her responses to the question, "Given the persons and needs on your two lists who would be able to specifically define the needs?"

2.2.4 Test the completeness of the decision maker's responses.

2.2.4.1 Identify those people whose responses to the above questions would prove helpful.

2.2.4.2 Acquire the responses of those people.

2.2.4.3 Present the responses to the decision maker and allow him/her to make any changes in the original lists that he/she believes are necessary.

2.2.5 The decision maker picks the most important entries on each list.

2.2.6 Using the above information the methodologist constructs sentences in the form of "who needs what according to whom."

2.2.7 The decision maker prioritizes the sentences constructed.

2.2.8 The decision maker chooses the first/next sentence.

2.2.9 The decision maker is asked to review the sentence to make sure that he/she is committed to having defining and measurement done on that sentence.

2.2.10 The decision maker confirms the sentence with any other appropriate individuals or groups that he/she wishes to.

2.2.11 The methodologist secures the cooperation of needers and definers.

2.3 Define who has needs for what according to whom.

2.3.1 Develop the defining stimulus.

2.3.1.1 The methodologist asks the decision maker to state the decision maker's purpose for obtaining data in relation to this sentence.

2.3.1.2 The methodologist develops a hypothetical situation appropriate to the decision maker's stated purpose.

2.3.1.3 The methodologist inserts the who and the what into the situation.

2.3.1.4 The methodologist determines how the definer should observe the situation.

2.3.1.5 The methodologist uses the above information to construct a defining stimulus of the following form: "Imagine (the hypothetical situation),

and in that situation imagine that (name of the needer)'s needs for (need being defined) are fully met. Observe that situation (in the manner specified in step 2.3.1.4). What are all the things that you see in the situation that indicate to you that (name of the needer)'s needs for (type of need being defined) are fully met?

2.3.1.6 The methodologist asks the decision maker to approve the defining stimulus. If the stimulus is not satisfactory then the methodologist should change it so that it is. Changes made should be determined by the decision maker.

2.3.2 Have the definer respond to the defining stimulus.

2.3.2.1 Set up a meeting with the definer.

2.3.2.2 Have the definer respond to the stimulus.

2.3.2.3 Record the definer's responses.

2.3.2.4 Have the definer prioritize his/her responses on the basis of importance.

2.3.2.5 Check the prioritized components for clarity.

2.3.2.6 If the resources permit further operationalize fuzzy components starting with the one having the highest priority.

2.3.2.7 If the resources permit have the definer prioritize any new responses.

2.3.2.8 Record all problems encountered in the defining process as well as any additional comments made by the definer regarding the need or the process.

2.3.3 Report the definer's definition to the decision maker.

2.3.3.1 Write the report.

2.3.3.1.1 Compile the results of the defining process.

2.3.3.1.2 Write a statement of the procedures used to obtain the definition.

2.3.3.1.3 Document all difficulties, problems or limitations encountered in the process.

2.3.3.1.4 Compile the above in the following sequence; who what whom sentence, stimulus, procedures, definition, and problems.

2.3.3.2 Present the report to the decision maker offering to answer any questions.

2.4 Measure the degree to which the definition of the need is being met.

2.4.1 Choose the components to be measured.

2.4.2 Test the completeness of the list of components chosen.

2.4.3 Prioritize the chosen components.

2.4.4 Review the prioritized components to make sure that the decision maker is committed to measuring these components.

2.4.5 Confirm the prioritized components with any relevant others chosen by the decision maker.

2.4.6 Allocate the measurement resources to the chosen components.

2.4.7 Review the allocation.

2.4.8 Choose the first/next component to be measured.

2.4.9 Determine on the basis of available resources whether the component is to be measured using short form procedures or long form procedures. If short form procedures are to be used proceed to 2.4.10. If long form procedures are to be used proceed to 2.4.11.

2.4.10 Ask the definer to estimate the degree to which the component is met.

2.4.11 Actually measure the extent to which the component is being met.

2.4.11.1 Conceptualize the ideal measurement technique. An ideal measurement technique has the following characteristics; it permits direct observation of the component. This means that the technique enables the observer to actually see or hear the occurrences of the component. It permits observation of the component under natural conditions. This means that the technique does not impose conditions or present stimuli other than those that are normally present in the situation being observed. Finally the ideal

measurement technique is unobtrusive. This means that the technique does not cause the persons being observed to be aware of the fact that they are being observed.

2.4.11.2 Review the ideal technique.

2.4.11.2.1 Is it practical? If yes proceed to the next step. If not proceed 2.4.11.4.

2.4.11.2.2 Does the ideal technique already exist? If so go to 2.4.11.5 If not proceed to the next step.

2.4.11.3 Design the ideal technique.

2.4.11.4 Design the practical observation technique by modifying the ideal technique so that it can be implemented within the available resources.

2.4.11.5 Design the sampling plan.

2.4.11.6 Design the recording device.

2.4.11.7 If possible field test the recording device and observational technique.

2.4.11.8 Report the measurement plan to the decision maker for final approval or modification.

2.4.11.9 Implement the measurement plan.

2.4.11.10 Report the measurement results to the decision maker.

2.4.11.11 Have the decision maker decide whether or not the component that was measured is a problem

that he/she would like to solve using the methodology.

2.5 Recycle to 2.2.8 and repeat the defining and measuring process for any other sentences that the decision maker would like to examine.

2.6 Prioritize all problems that have been identified through the above steps.

2.7 Evaluate the implementation of this major process.

2.8 Cycle back to step 1.6.7 and choose the next piece of work to be done.

3.0 Determine a statement of the purpose with respect to the problem area with which this application of the methodology will deal.

3.1 Plan the implementation of this major process.

3.1.1 Compile the following information.

3.1.1.1 The amount of resources that are available to implement this major process.

3.1.1.2 A brief description[1] of the work that has already been done on the problem for which this major process is to be applied.

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[1]The length of these descriptions will depend upon such factors as the competence of the decision maker, the decision maker's understanding of the methodology, and how much time has elapsed between meetings with the methodologist. If the methodologist has been working almost continuously with a very competent decision maker, who is well aware of the purpose and procedures of the methodology, these descriptions will not have to be very long. However, more detailed descriptions may be needed if either the competence or understanding of the decision maker is in doubt or if a great deal of time has elapsed between meetings with the methodologist.

3.1.1.3 A brief description of the procedures that may be used to implement this major process and the resources that may be allocated to each.

3.1.1.4 A brief description of the major processes that remain to be implemented for this problem and how the results of this major process will be used in successive major processes.

3.1.1.5 A brief description of the contingencies under which the implementation of this major process could be halted or modified.

3.1.2 Arrange a meeting with the decision maker for the purpose of planning the implementation of this major process.

3.1.3 Meet with the decision maker and perform the following tasks:

3.1.3.1 Have the decision maker confirm his/her intention to continue working with the methodologist. If the commitment of the decision maker has changed determine the problem. Once the problem has been identified make a judgment as to whether or not it can be solved practically. If so solve it; if not stop work and inform the contract decision maker of the situation.

The final resolution of the problem should be approved by the contract decision maker.

3.1.3.2 Have the decision maker confirm the amount of resources that are to be used in the implementation of this major process. If the planned amount of resources is inaccurate or impossible to provide the decision maker correct it and then communicate this corrected amount of resources to the contract decision maker.

3.1.3.3 Present the decision maker with the brief description of the work that has already been done on the problem for which this major process is to be implemented. Check for the decision maker's understanding of the description. Answer (as clearly and completely as possible) any questions that the decision maker may have.

3.1.3.4 Present the decision maker with the brief description of the procedures that may be used to implement this major process and the resources that may be allocated to each. Check for the decision maker's understanding of the planned procedures. Answer (as clearly and as completely as possible) any questions that the decision maker may have. Have the decision maker confirm

or modify the resources that have been allocated to the planned procedures.

3.1.3.5 Present the decision maker with the brief description of the major processes that remain to be implemented with this particular problem and explain how the results of the present major process will be used in successive major processes. Check to make sure that the decision maker understands these subsequent major processes and answer any critical questions that the decision maker may have.

3.1.3.6 Describe to the decision maker the contingencies under which the implementation of this major process could be halted or modified. Check for the decision maker's understanding of these contingencies and answer (as completely and as clearly as possible) any questions that the decision maker might have.

3.1.3.7 Determine the specific dates on which the decision maker will be available to implement this major process.

3.1.3.8 Choose the first/next date.

3.1.3.9 Review the date to make sure that it does not conflict with any critical activities that the decision maker will be involved in at that time. If there is a conflict determine if an

alternative date can be decided upon for one of the conflicting activities. If an alternative date cannot be found then the contract decision maker should be involved in the resolution of the conflict.

3.1.3.10 Have the decision maker confirm the date and if possible set an alternative date.

3.1.3.11 Develop the agenda to be followed with the decision maker on the chosen date. This agenda should include the methodological procedures to be used. The agenda should be as complete as possible given the available resources. The last two procedures of the agenda should provide for evaluation and redesign and for cycling the methodologist back to step 1.6.7 where he/she will choose the next piece of work to be done.

3.1.3.12 Review the agenda.

3.1.3.13 Plan for providing feedback on the effectiveness of the agenda as it is being implemented.

3.1.3.14 Implement the agenda.

3.2 The decision maker determines what is presently known about the need which is to be met by performing any combination of the following tasks:

3.2.1 Read literature which relates to the need.

3.2.2 Talking to people whose work is involved in meeting the need.

3.2.3 Examine actual efforts to meet the need.

3.2.4 Talk to people who are or have been effected or served by efforts to meet the need.

3.2.5 Talk to people who at one time were involved in meeting the need but who have discontinued their involvement.

3.2.6 Think about the need.

3.2.7 Try out tools that already exist for meeting the need.

3.3 If the above analysis indicates that the chosen need represents a very complex problem area then choose a piece of the original need and repeat the previous step for the chosen piece.

3.4 Create a list of purposes that validly express your intentions for meeting the chosen need.

3.5 Choose the most appropriate purpose.

3.6 Test the chosen purpose.

3.6.1 Can the chosen purpose be expanded to include other unfilled needs? If so expand, if not proceed.

3.6.2 Is the purpose trivial? Is it clear that the purpose as stated requires a specific solution? Does the purpose contain sufficient qualifiers (nouns, adjectives, adverbs, phrases and clauses)? If the purpose is trivial revise it, until it isn't.

3.6.3 If the purpose is accomplished will it meet the need? If not revise it until it does.

3.6.4 Is the decision maker committed to accomplishing this purpose? If not develop a purpose which will carry the commitment of the decision maker.

3.6.5 Is the purpose ethical?

3.6.5.1 Is the purpose consistent with the decision maker's value system?

3.6.5.2 Is the purpose consistent with the methodologist's value system?

3.6.5.3 Will the purpose when accomplished promote the general welfare?

3.6.5.4 Revise the purpose until it is ethical with respect to the above standards.

3.6.6 Determine if the purpose will have any serious negative effects on those who might participate in or be effected by a solution to accomplish it. If the purpose will produce such effects change it so that they are eliminated or minimized.

3.6.7 Is the purpose definable? Can it be described in terms of directly observable behaviors or states? If not revise it until it is definable.

3.6.8 Is the purpose practical? Can it be accomplished within the available resources? If not revise it until it is practical.

3.6.9 Are existing solutions insufficient? Do any solutions exist that can accomplish the purpose? If there are either, revise the purpose or adopt the existing solution.

3.6.10 If any of the above tests have resulted in a changed purpose then that purpose should be taken through all other tests separately.

3.6.11 Have other people perform any or all of the above tests.

3.6.12 Write out the acceptable purpose.

3.7 Evaluate the implementation of this major process.

3.7.1 Determine the resources that are available for evaluation.

3.7.2 Allocate these resources among the procedures of this step.

3.7.3 Develop the evaluation criteria.

3.7.3.1 If the resources are small then the purpose of the procedures that have just been implemented will serve as their evaluation criterion. In this case the methodologist should cycle to 3.9.7.

3.7.3.2 If the resources are large then the purpose of the procedures that have just been implemented should be operationally defined. These operational components will serve as evaluation criteria. If this approach is followed the methodologist should operationalize the purpose and then proceed to the next step.

3.7.4 Prioritize the evaluation criteria.

3.7.5 Allocate the resources for measurement among the prioritized criteria.

3.7.6 Choose the first/next criterion.

3.7.7 Determine if data needs to be gathered on the accomplishment of this criterion. This determination may be made by examining the results of the procedures that have just been implemented. If the methodologist believes that such an examination is sufficiently thorough enough to enable a determination to be made as to whether or not the criterion has been accomplished then no additional data needs to be gathered. In this case the methodologist should proceed to 3.9.5.

3.7.8 Gather the data that must be acquired in order to determine if the evaluation criteria have been satisfied.

3.7.9 Review the data.

3.7.10 Make any necessary changes.

3.7.11 Recycle to 3.9.5 and repeat the last four steps for the remaining evaluation criteria.

3.7.12 If the decision maker and the methodologist agree to it make the evaluation data and resultant changes available to other decision makers who may be interested in the problem and/or to other methodologists who may be interested in the methodology.

3.7.13 If resources and desire permit perform an evaluation of the evaluation.

3.8 Cycle back to step 1.6.7 and choose the next piece of work to be done.

4.0 Conceptualize the ideal solution.

4.1 Plan the implementation of this step.

4.1.1 Repeat step 3.1 for this major process.

4.2 Develop a list of alternative ideal solutions.

4.2.1 Record the decision maker's response to the following stimuli:

"Imagine a situation in which you have unlimited resources. How might you accomplish your purpose in such a situation?"

"Imagine that at this very moment you have access to unlimited resources. How would you use these resources to accomplish your purpose if you were to accomplish it right now?"

4.2.2 Repeat the above step for situations in which there are unlimited amounts of certain types of resources - such as money, time, curricular material, instructional hardware, personnel, space, etc.

4.2.3 Test the completeness of the decision maker's list of alternative ideal solutions by doing any one or combination of the following things:

4.2.3.1 Have others repeat the last two steps.

4.2.3.2 Read utopian, critical or futuristic literature on the problem area.

4.2.3.3 Make usual solutions ideal solutions.

4.2.3.3.1 Develop a list of usual solutions for this purpose.

4.2.3.3.1.1 Write down all the ways that you could accomplish this purpose.

4.2.3.3.1.2 Write down all the ways that you could fail to accomplish this purpose and then state them positively so that they are ways of accomplishing the purpose.

4.2.3.3.1.3 If you were actually accomplishing the purpose what would you be doing.

4.2.3.3.1.4 Write down all the unusual ways of accomplishing the purpose.

4.2.3.3.1.5 Combine all responses into a single list of solutions.

4.2.3.3.1.6 Test this list for completeness.

4.2.3.3.2 Develop a list of usual solutions to similar purposes or problems.

4.2.3.3.2.1 Develop a list of problems or purposes which are similar to this one.

4.2.3.3.2.2 Of the problems identified determine which ones have actually been dealt with by the decision maker and which have not.

4.2.3.3.2.3 For the ones which have been actually dealt with complete the following sentences.

4233231 State how you solved the problem if you dealt with it successfully. Can you state any other ways of solving the problem? If so state them.

4233232 State how you failed to solve the problem if you dealt with it unsuccessfully. Can you state any other ways in which you could have failed to solve

the problem. If so state them and then make them positive so that they may be considered as ways of solving the problem.

4233233 State any unusual ways in which you could have solved this problem.

4.2.3.3.2.4 For the problems that have not been actually dealt with complete the following sentences.

4233241 Write down all the ways in which this problem could be solved.

4233242 Write down and then negate all the ways by which you could have failed to solve the problem.

4233243 Write down what you would be actually doing if you were solving the problem.

4233244 Write down all the unusual ways in which you could solve the problem.

4.2.3.3.2.5 Combine all the above responses into a single list.

4.2.3.3.2.6 Test the list for completeness.

4.2.3.3.3 Develop a list of solutions to problems that have nothing to do with the original problem.

4.2.3.3.3.1 Develop a list of problems that have nothing to do with the original problem.

4.2.3.3.3.2 For each of the above problems write out all the ways you could solve the problem.

4.2.3.3.3.3 For each of the above problems write out all the ways in which you could fail to solve the problem and then state them positively.

4.2.3.3.3.4 If you were actually solving the problem write down what you would be doing.

4.2.3.3.3.5 Write down all the unusual ways of accomplishing the problem.

4.2.3.3.3.6 Combine all the above into a single list.

4.2.3.3.3.7 Test the list for completeness.

4.2.3.3.4 Combine all the above lists (4.2.3.3.1.6, 4.2.3.3.2.5, 4.2.3.3.3.7) into a single list of usual solutions.

4.2.3.3.5 Have the decision maker review the list and discard any solutions that he/she believes would not accomplish the original purpose.

4.2.3.3.6 Choose the first/next usual solution that will be made into an ideal solution.

4.2.3.3.7 Make the chosen solution an ideal solution by modifying it in light of a situation in which there are unlimited resources available for its implementation.

4.2.3.3.8 If resources permit have the decision maker modify the usual solution in light of a situation in which there are unlimited amounts of specific types of resources, such as time, money, personnel, curricular material, instructional hardware, space, etc.

4.2.3.3.9 Recycle to step 4.2.3.3.5 and repeat the last two steps for as many of the usual solutions as possible.

4.2.3.4 Have the decision maker review these additional lists of ideal solutions and make any changes in the original list of ideal solutions that he/she believes are necessary.

4.3 Choose the most appropriate ideal solution.

4.3.1 Determine the resources that are available for the selection process.

4.3.2 Allocate these resources among the solutions to be examined.

4.3.3 If only a very small amount of resources are allocated to each alternative solution, the decision maker may want to do either or both of the following things:

4.3.3.1 Narrow the list down so that a larger amount of resources can be allocated to each alternative solution.

4.3.3.2 Acquire additional resources so that a larger amount of resources can be allocated to each alternative solution.

4.3.4 Allocate the resources for each alternative among the activities of the selection processes that are documented in steps 4.3.8 through 4.3.12.

4.3.5 The methodologist examines the allocation and then describes to the decision maker the type of results that can be expected to be generated by each of the selection processes. This description should not be judgmental. It should be informative. It should outline, as objectively and as completely as possible, the type and amount of data that can be expected to be generated by each selection process given the resources that are available to implement the respective processes.

4.3.6 The decision maker selects the process that he/she believes will be most effective. This selection can be based on such criteria as the degree to which the solutions are fully developed during the selection process.

A process that operationally defines the solution is advisable to one that does not develop the solution past the level of a general descriptive statement. Another criterion that could be used is the extent to which the selection process provides for the actual implementation of the solution. A process in which the solution is actually carried out to determine its ability to accomplish the decision maker's purpose is advisable to one in which the effects of implementing the solution are imagined rather than observed directly.

4.3.7 Proceed to the set of steps that provide for implementing the chosen selection process. Step 4.3.8 should be used if estimating the probabilities of the success of the alternative solutions was the process chosen; step 4.3.9 should be used if the Delphi technique was the process chosen; step 4.3.10 should be used if modelling was the process that was chosen; step 4.3.11 should be used if simulation was the process that was chosen; and step 4.3.12 should be used if field testing was the process that was chosen.

4.3.8 Estimate the probabilities of success for each of the alternative solutions.

4.3.8.1 Generate the criteria against which the alternatives will be measured by having the decision maker perform the following activities:

4.3.8.1.1 Imagine a hypothetical situation in which your purpose has just been

accomplished. All the people, places, objects, etc., involved with your purpose are in this situation; this includes yourself. Look at this situation; observe it very carefully. On a separate piece of paper, put down all the events, actions and verbalizations that tell you that your purpose has been accomplished.

4.3.8.1.2 If resources allow, have other people do the above and use their input to make changes on your original list.

4.3.8.1.3 If resources allow and you have ever had a similar problem before, think up all the criteria that you used then to tell yourself that you had successfully accomplished this similar problem. Check your original list to see if each of your criteria is on the list; for any criteria that are not on the list add them to the list.

4.3.8.1.4 Check through the list and for each criteria, decide if it is truly a criteria for you -- that is, if this criteria doesn't happen does that

really tell you that your purpose has failed. Cross off any criteria that do not pass this test.

4.3.8.1.5 Choose the six most important criteria on your list. That is, choose those criteria that tell you more than any others that your purpose is accomplished. If there are more than six, then do not stop at six, but try to choose at least six.

4.3.8.2 Construct a selection matrix.

4.3.8.2.1 Count the number of alternatives to be examined.

4.3.8.2.2 Count the number of selection criteria to be used.

4.3.8.2.3 Construct a matrix whose number of rows equals one plus the number of alternative solutions and whose number of columns equals one plus the number of selection criteria.

4.3.8.2.4 Invent a short name for each alternative solution.

4.3.8.2.5 Enter these names in the first column of the matrix starting with the second cell in that column.

There should be one alternative per cell.

4.3.8.2.6 Invent a short name for each selection criteria.

4.3.8.2.7 Enter these names in the first row of the matrix starting with the second cell in that row. There should be one criteria per cell.

4.3.8.3 Measure the alternatives against the selection criteria.

4.3.8.3.1 Take the first alternative solution and look at it in relation to the criteria for accomplishing the purpose.

4.3.8.3.2 For each criteria decide whether the solution is likely to accomplish that criteria and put an "L" in the appropriate cell of the matrix if it is likely to (that is the chance is greater than 50% as you estimate it). You must estimate how probable this is based on your perceptions of the solution. Put an "N" in the appropriate cell of the matrix if the solution is not likely to meet the criteria.

4.3.8.3.3 For each criteria for which there is an "L" under the solution determine the probability that the solution will accomplish each of these criteria. Becuase you put an "L" in the cell the probabilities will be greater than or equal to .5.

4.3.8.3.4 For each criteria for which there is an "N" under the solution determine the probability that the solution will accomplish this criteria. This probability should be less than or equal to .49.

4.3.8.3.5 Do this process for each of the solutions listed in the matrix. If the resources are short prioritize the solutions as to the ones you feel most likely to accomplish the purpose and then do the above process for as many of the solutions as possible according to their priority order.

4.3.8.3.6 If resources allow have other persons perform the above steps and then use their input to revise your probabilities if you believe that such revision is warrented.

4.3.8.4 Choose the most appropriate solution.

4.3.8.4.1 Choose the first solution listed on the matrix.

4.3.8.4.2 Total the probabilities of that alternative meeting each of the selection criteria.

4.3.8.4.3 Repeat the above two steps for each alternative listed in the matrix.

4.3.8.4.4 Choose that solution whose total is the highest.

4.3.9 Choose the most appropriate solution through the use of the Delphi technique. A general outline of the procedures necessary to implement this technique can be found in any one of the following sources: The Delphi Method: Substance, Context, a Critique, and an Annotated Bibliography (Pill 1971); The Delphi Method and Urbanization (B. Marley-Clark 1974); or Personnel Administration in 1980: A Delphi Study (Lachmann 1972).

4.3.10 Use modelling to choose the most appropriate solution. A general outline of the procedures necessary to construct a model may be found in any one of the following sources: Visualizing Change, Model Building and the Change Process (Lippitt 1973); Work Design: A Systems Concept (Nadler 1970); Organizational Management (Michael and Jones 1973).

4.3.11 Choose the most appropriate solution through the use of a simulation process. A general outline of the

procedures necessary to carry out simulations may be found in any one of the following sources: Handbook of Games and Simulation Exercises (Gibbs 1974); and Simulation and Gaming in Social Sciences (Inbar 1972).

4.3.12 Field test the alternative solutions.

4.3.12.1 Allocate the resources among the alternatives to be field tested.

4.3.12.2 Allocate the resources for each alternative among the procedures of this step.

4.3.12.3 Determine when the alternatives are to be field tested. This is a preliminary determination and may change as the alternative solutions become more clearly defined.

4.3.12.4 For each alternative determine when the details of the field test are to be worked out. The decision maker should identify a period of time prior to implementation of the field test during which the procedures of this step up to but not including 4.3.12.26 can be carried out.

4.3.12.5 Choose the first/next alternative solution for which the details of the field test are to be worked out.

4.3.12.6 Design the major elements of the solution.

4.3.12.6.1 Develop an initial list of major elements.

4.3.12.6.1.1 Imagine and write down all the ways in which you could implement this alternative solution avoiding all problems.

4.3.12.6.1.2 Imagine and write down in what ways you could fail to implement this alternative solution.

4.3.12.6.1.3 Imagine the solution being implemented write down what is happening.

4.3.12.6.1.4 Think up elements that have nothing to do with implementing the solution and consider whether they do or not.

4.3.12.6.1.5 Create one list from all the lists generated in the previous steps. For the elements generated in 4.3.12.6.1.2 change their statements so that they describe an element that could be used in the implementation of the solution.

4.3.12.6.2 Test the completeness of the list of major elements by performing any combination of the following activities:

4.3.12.6.2.1 Have others perform the previous steps. Examine their responses and decide if their list of elements contains elements that you would like to add to your original list. If so, do so.

4.3.12.6.2.2 Think up alternatives to your original list of elements and then consider if these alternatives should be added to your original list. Make any additions that you believe are appropriate.

4.3.12.6.2.3 Think up unusual ways of implementing the alternative solution and then consider if these items could be one of the solution's major elements. If you believe that they can you should add them

to your original list of major elements.

4.3.12.7 Examine your list of major elements and discard any that you believe are not necessary for the implementation of the solution.

4.3.12.8 Arrange the major elements in the order in which they would be implemented if the alternative solution were actually being carried out.

4.3.12.9 Have the decision maker review the list of elements to make sure that he/she has a clear idea of what each element means, that there is a logical flow from one element to another, and that critical elements are not missing from the list. This review may give the decision maker an insight into the possible effectiveness of a particular alternative solution. If this insight indicates to the decision maker that the alternative would be clearly ineffective or at best much less effective than some other alternative the decision maker may want to halt the field testing of this alternative and allocate the resources remaining for the testing of this alternative to some other section of the methodology or to some other problem that is of concern to the decision maker.

4.3.12.10 Confirm the elements with any other individuals or groups whom the decision maker may choose on the basis of law, policy or personal preference. This procedure provides the decision maker with the option of offering the solution's list of elements to others for their critique. Their comments may give the decision maker the same insight that may have been gained in the previous step; that is, an insight into the solutions' effectiveness. If such an insight is gained then the decision maker should consider the same option that was discussed above.

4.3.12.11 Choose the elements to be field tested. This choice could be made on the basis of such criteria as: which elements have to be implemented first, which elements have the highest risk of failure, which elements are most confusing to the decision maker, which elements would generate the most serious consequences if they failed, or which elements consume the greatest amount of resources. These are possible rather than mandatory criteria. Others could be used. However, any criteria used should at least be approved by and if possible developed in cooperation with the decision maker.

4.3.12.12 For each element determine when the activities for implementing that element can be developed.

4.3.12.13 Choose the first/next element for which implementation activities are to be worked out.

4.3.12.14 Develop the activities necessary to implement that element.

4.3.12.14.1 Develop an initial list of activities.

4.3.12.14.1.1 Imagine and write down all the ways in which you could implement this element, avoiding all problems.

4.3.12.14.1.2 Imagine and write down in what ways you could fail to implement this element.

4.3.12.14.1.3 Imagine the element being implemented write down what is happening.

4.3.12.14.1.4 Think up activities that have nothing to do with implementing this element and consider whether they do or not.

4.3.12.14.1.5 Create one list from all the lists generated in the previous steps. For the activities generated in 4.3.12.14.1.2 change their statements so that they describe an activity that could be used in the implementation of the element.

4.3.12.14.2 Test the completeness of the list of activities by performing any combination of the following steps:

4.3.12.14.2.1 Have others perform the previous steps. Examine their responses and decide if their list of activities contains activities that you would like to add to your original list. If so, do so.

4.3.12.14.2.2 Think up alternatives to your original list of activities and then consider if these

alternatives should be added to your original list. Make any additions that you believe are appropriate.

4.3.12.14.2.3 Think up unusual ways of implementing the element and then consider if these items could be one of the activities for implementing the element. If you believe that they can you should add them to your original list of activities.

4.3.12.15 Examine your list of activities and discard any that you believe are not necessary for the implementation of the element.

4.3.12.16 Arrange the activities in the order in which they would be implemented if the element were actually being carried out.

4.3.12.17 Have the decision maker review the list of activities to make sure that he/she has a clear idea of what each activity means, that there is a logical flow from one activity to another, and that critical activities are not missing from the list.

4.3.12.18 Confirm the activities with any individuals or groups whom the decision maker may choose on the basis of law, policy or personal preference.

4.3.12.19 Choose the activities to be field tested. This choice could be made on the basis of such criteria as: which activities are most critical with respect to accomplishing the purpose, which activities have to be implemented first, which activities have the highest risk of failure, which activities are most confusing to the decision maker, which activities would generate the most serious consequences if they failed, or which activities consume the greatest amount of resources. These are possible rather than mandatory criteria. Others could be used. However, any criteria used should be at least approved by and if possible developed in cooperation with the decision maker.

4.3.12.20 Determine when each activity can be field tested.

4.3.12.21 Choose the first/next activity to be field tested.

4.3.12.22 Develop the criteria against which the activities will be tested. These criteria could be drawn from any one of the following sources:

-- the purpose of the activity

-- the purpose of the element of which the

activity is a part,

-- the purpose of the solution of which the element is a part,

-- the goals that the decision maker has for the field test.

4.3.12.23 Develop an observational technique for measuring the effectiveness of the activity in meeting the chosen criteria.

4.3.12.24 Determine if any additional tests are to be or can be carried out at this time. If so, cycle to step 4.3.12.21 if these additional tests are to involve additional activities of the same element, to step 4.3.12.14 if these additional tests are to involve other elements of the same alternative solution, or to step 4.3.12.5 if these additional tests are to involve different alternatives.

4.3.12.25 Implement the tests that have been planned.

4.3.12.26 Compile the results of the tests that have been implemented.

4.3.12.27 Review the results compiled.

4.3.12.28 Carry out any additional testing that remains to be done. No testing will remain to be done if the decision maker believes that he/she can choose the most appropriate solution based on the testing already performed. Also, no

testing will remain to be done if the resources for implementing this step have run out. It is also possible that the decision maker will be dissatisfied with the results of previous testing and may want to perform additional tests. If additional testing is to be performed the methodologist should repeat appropriate sections of the above procedures.

4.3.12.29 Choose the most appropriate ideal solution using the results of the testing that has been performed.

4.4 Have the decision maker review the solution to make sure that he/she believes that it is the most effective way of accomplishing the purpose. If the decision maker is not convinced as to the solution's effectiveness then the solution should be changed. At this point the decision maker may want to develop an entirely different solution. If a new solution is developed the decision maker should examine it against his/her purpose using one of the above selection processes.

4.5 Confirm the chosen solution with any individuals or groups that the decision maker may choose on the basis of law, policy or personal preference.

4.6 Evaluate the effectiveness of this major process.

4.6.1 Repeat step 3.7 for this major process.

4.7 Determine if the ideal solution is a feasible way of accomplishing the purpose. If the ideal solution is also a feasible solution proceed to step 6.0 and plan the

implementation of the solution. If not simply proceed to the next step.

4.8 Cycle back to step 1.6.7

5.0 Develop the actual solution.

5.1 Plan the implementation of this major process.

5.1.1 Repeat step 3.1 for this major process.

5.2 Determine if the elements of the ideal solution have been developed. If they have then proceed to the next step. If not then proceed to step 5.6.

5.3 Arrange the parts of the ideal solution in the order in which feasible alternatives will be designed for them.

5.4 Allocate the resources for implementing the rest of this major process among the parts of the ideal solution.

5.5 Choose the first/next ideal part for which a feasible alternative is to be developed.

5.6 State the purpose of the ideal part or ideal solution.

5.7 Determine the resources that are actually available for implementing the ideal part or the ideal solution.

5.8 Have the decision maker respond to the following stimulus: Imagine a situation in which you only have (the amount of resources identified in step 5.7) available for accomplishing (the purpose identified in step 5.6). How might you change the ideal (solution or part) so that it can be implemented within the available resources. Every effort should be made to change the ideal as little as possible.

5.9 Test the completeness of the decision maker's list of feasible alternatives by performing any combination of the following activities:

5.9.1 Have others repeat step 5.8.

5.9.2 Ask the decision maker to imagine a situation in which he/she is at this very moment actually attempting to accomplish the purpose of the ideal solution or part within the resources that are available for implementing that solution or part. Have him/her observe that situation very carefully and write down all that he/she sees happening. Have him/her then consider whether the items that have been identified might be viewed as feasible alternatives and if so add them to the list of feasible alternatives.

5.9.3 Have the decision maker generate alternatives to his/her feasible alternatives.

5.9.4 If feasible alternatives are being generated for the ideal solution as a whole have the decision maker review the list of usual solutions for accomplishing the purpose of the ideal solution that were developed in step 4.2.3.3 and consider whether these usual solutions might be added to the list of feasible solutions.

5.9.5 If feasible alternatives are being developed for a particular part of the ideal solution have the decision maker generate usual structures for accomplishing the part's purpose and then modify these structures so that they are as ideal as possible.

5.10 Choose the most appropriate feasible alternative.

5.10.1 Repeat step 4.3 for this feasible alternative.

5.11 Have the decision maker review the solution to make sure that he/she believes that it is the most effective way of accomplishing the purpose. If the decision maker is not convinced as to the solution's effectiveness then the solution should be changed. At this point the decision maker may want to develop an entirely different solution. If a new solution is developed the decision maker should examine it against his/her purpose using one of the above selection processes.

5.12 Confirm the chosen solution with any individuals or groups that the decision maker may choose on the basis of law, policy or personal preference.

5.13 Evaluate the effectiveness of this major process.

5.13.1 Repeat step 3.7 for this major process.

5.14 Cycle back to step 1.6.7.

6.0 Plan the implementation of the solution.

6.1 Plan the implementation of this major process.

6.1.1 Repeat step 3.1 for this major process.

6.2 If the elements of the feasible solution have not been designed then proceed to the next step. If the elements of the feasible solution have been developed proceed to step 6.7.

6.3 Design the major elements of the feasible solution.

6.3.1 Imagine and write down all the ways in which you could implement this solution, avoiding all problems.

6.3.2 Imagine and write down in what ways you could fail to implement this solution.

6.3.3 Imagine the solution being implemented write down what is happening.

6.3.4 Think up elements that have nothing to do with implementing the solution and consider whether they do or not.

6.3.5 Create one list from all the lists generated in the previous steps. For the elements generated in step 6.3.2 change their statements so that they describe an element that could be used in the implementation of the solution.

6.3.6 Test the completeness of your list of elements by performing any one or combination of the following activities:

6.3.6.1 Have others perform the previous steps. Examine their responses and decide if their list of elements contain elements that you would like to add to your list. If there are such elements then add them to your list.

6.3.6.2 Think up alternatives to your original list of elements and then consider if these alternatives should be added to your original list. Make any additions that you believe are appropriate.

6.3.6.3 Think up unusual ways of implementing the solution and then think if these could be one of the solution's major elements. If you believe that they can be then you should add

them to your original list of major elements.

6.3.7 Examine your list of major elements and discard any that you believe are not necessary for the implementation of the solution.

6.4 Review the major elements.

6.4.1 Review the entire list of elements.

6.4.1.1 Arrange the elements in the order in which they would be carried out if the elements were being carried out.

6.4.1.2 Is the list of elements complete?

6.4.1.2.1 Simple Method: Review the list of elements in light of the solution's purpose and determine if there are an adequate number of elements for accomplishing the purpose. Any missing element should be added.

6.4.1.2.2 Complex Method: Review the list of elements in light of the operational components of the purpose and determine if there are an adequate number of elements for accomplishing each component. Any missing element should be added.

6.4.1.3 Are there anchoring elements? If not add them.

6.4.1.4 Is there logical flow from one element to another? Critical gaps between elements should

be filled.

6.4.1.5 Will serious problems arise during the implementation of the elements.

6.4.1.5.1 Simple Method: Ask the decision maker the following question: "Do you foresee serious problems arising during the implementation of the elements; and if so what are they?" A serious problem is one that would significantly hinder the solution from accomplishing its purpose. If serious problems can be predicted the decision maker should either modify the solution so that there are mechanisms for dealing with the problem should it arise, or the decision maker should take steps to eliminate the cause of the problem.

6.4.1.5.2 Complex Method:

6.4.1.5.2.1 Have the decision maker list the serious problems that may arise during implementation.

6.4.1.5.2.2 Order these problems on the basis of how seriously they would hinder the accomplishment

of the purpose of the solution.

6.4.1.5.2.3 Determine the probability of each problem occurring. This can be done in a number of ways for instance the decision maker could have the methodologist gather data on the probability of the problem.

6.4.1.5.2.4 If the above step indicates that a serious problem will arise during implementation then the decision maker may want to either take steps to eliminate the cause of the problem and thereby hopefully eliminate the problem itself, or take steps to plan for dealing with the problem should it arise.

6.4.1.6 Will serious negative effects on other people arise during the implementation of the elements?

Any negative effects should be eliminated or at least minimized.

6.4.1.7 Can the elements be implemented within the available resources? If not the elements should be changed so that they can be implemented practically.

6.4.2 If the resources and desire permit, review the elements individually.

6.4.2.1 Prioritize the list of elements.

6.4.2.2 Select the first/next element.

6.4.2.3 State the element's purpose.

6.4.2.4 Test the purpose.

6.4.2.5 Examine the element to determine if it is clearly defined. If not clarify it.

6.4.2.6 Examine the element to determine if it is stated procedurally. If not restate it.

6.4.2.7 Is the element necessary?

6.4.2.7.1 Simple Method: Have the decision maker make a judgment as to whether or not it is highly probable that some unforeseen event will cause the purpose of the element to be accomplished. If this could happen then it might be unnecessary to implement the element.

6.4.2.7.2 Complex Method: Develop a list of unforeseen events that may cause the

purpose to be accomplished.

6.4.2.7.3 Order these events on how completely they would accomplish the purpose.

6.4.2.7.4 Determine the probability of each happening.

6.4.2.7.5 If the above step indicates that some unplanned event will accomplish the purpose of the element then the decision maker may want to consider deleting the element from his/her list.

6.4.2.8 Repeat step 6.4.1.5 for the element.

6.4.2.9 Repeat step 6.4.1.6 for the element.

6.4.2.10 Repeat step 6.4.1.7 for the element.

6.4.2.11 Recycle back to 6.4.2.2 and repeat as many of the above steps for as many of the elements as possible.

6.5 Confirm the elements with those individuals or groups that the decision maker may choose on the basis of law, policy or personal preference.

6.6 Prioritize the elements so as to be able to determine how much resources should be devoted to each for the purpose of designing the activities that will be necessary to implement a particular element.

6.7 Allocate the design resources to the elements according to their priorities.

6.8 Choose the first/next element.

6.9 Perform steps 6.4.2.3 and 6.4.2.4 if they have not already been carried out.

6.10 Design the activities necessary to implement the element.

6.10.1 Imagine and write down all the ways in which you could implement this element avoiding all problems.

6.10.2 Imagine and write down in what ways you could fail to implement this element.

6.10.3 Imagine the element being implemented write down what is happening.

6.10.4 Think up activities that have nothing to do with implementing the element and consider whether they do or not.

6.10.5 Create one list from all the lists generated in the previous steps. For the activities generated in step 6.3.2 change their statements so that they describe an activity that could be used in the implementation of the element.

6.10.6 Test the completeness of your list of activities by performing any combination of the following procedures:

6.10.6.1 Have others perform the previous steps. Examine their responses and decide if their list of activities contains activities that you would like to add to your list. If there are such activities then add them to your list.

6.10.6.2 Think up alternatives to your original list of activities and then consider if these alternatives should be added to your original list. Make any additions that you believe are appropriate.

6.10.6.3 Think up unusual ways of implementing the element and then think if these items could be one of the activities necessary to implement the element. If you believe that they can be then you should add them to your original list of activities.

6.10.7 Examine your list of activities and discard any that you believe are not necessary for the implementation of the element.

6.11 Review the activities.

6.11.1 Review the entire list of activities.

6.11.1.1 Arrange the activities in the order in which they would be carried out if the activities were being carried out.

6.11.1.2 Is the list of activities complete?

6.11.1.2.1 Simple Method: Review the list of activities in light of the element's purpose and determine if there are an adequate number of activities for accomplishing the purpose. Any missing activities should be added.

6.11.1.2.2 Complex Method: Review the list of activities in light of the operational components of the purpose and determine if there are an adequate number of activities for accomplishing each component. Any missing activities should be added.

6.11.1.3 Are there anchoring activities? If not add them.

6.11.1.4 Is there logical flow from one activity to another? Critical gaps between activities should be filled.

6.11.1.5 Will serious problems arise during the implementation of the activities?

6.11.1.5.1 Simple Method: Ask the decision maker the following question: "Do you foresee serious problems arising during the implementation of the activities; and if so what are they?" A serious problem is one that would significantly hinder the element from accomplishing its purpose. If serious problems can be predicted the decision maker should either modify the solution so that there are mechanisms for dealing with the

problem should it arise or the decision maker should take steps to eliminate the cause of the problem.

6.11.1.5.2 Complex Method:

6.11.1.5.2.1 Have the decision maker list the serious problems that may arise during implementation.

6.11.1.5.2.2 Order these problems on the basis of how seriously they would hinder the accomplishment of the purpose of the element.

6.11.1.5.2.3 Determine the probability of each problem occurring. This can be done in a number of ways for instance the decision maker could have the methodologist gather data on the probability of the problem.

6.11.1.5.2.4 If the above step indicates that a serious

problem will arise during implementation then the decision maker may want to either take steps to eliminate the cause of the problem and thereby hopefully eliminate the problem itself, or take steps to plan for dealing with the problem should it arise.

6.11.1.6 Will serious negative effects on other people arise during the implementation of the activities. Any negative effects should be eliminated or at least minimized.

6.11.1.7 Can the activities be implemented within the available resources? If not the activities should be changed so that they can be implemented practically.

6.11.2 If the resources and desire permit review the activities individually.

6.11.2.1 Prioritize the list of activities.

6.11.2.2 Select the first/next activity.

6.11.2.3 State the activity's purpose.

6.11.2.4 Test the purpose.

6.11.2.5 Examine the activity to determine if it is clearly defined. If not clarify it.

6.11.2.6 Examine the activity to determine if it is stated procedurally. If not restate it.

6.11.2.7 Is the activity necessary?

6.11.2.7.1 Simple method: Have the decision maker make a judgment as to whether or not it is highly probable that some unforeseen event will cause the purpose of the activity to be accomplished. If this could happen then it might be unnecessary to implement the activity.

6.11.2.7.2 Complex method: Develop a list of unforeseen events that may cause the purpose to be accomplished.

6.11.2.7.3 Order these events on how completely they would accomplish the purpose.

6.11.2.7.4 Determine the probability of each happening.

6.11.2.7.5 If the above step indicates that some unplanned event will accomplish the purpose of the activity then the decision maker may want to consider deleting the activity from his/her list

6.11.2.8 Repeat step 6.11.1.5 for the activity.

6.11.2.9 Repeat step 6.11.1.6 for the activity.

6.11.2.10 Repeat step 6.11.1.7 for the activity.

6.11.2.11 Determine if each activity is appropriate. (Within the person's present knowledge, capability and skill.)

6.11.2.11.1 State who is going to be performing the activity.

6.11.2.11.2 Identify a behavior presently existing in that person's repertoire that is identical or similar to the expected activity.

6.11.2.11.3 Plan for the observation of that activity.

6.11.2.11.4 Plan for the reporting of the data collected.

6.11.2.11.5 Integrate and implement the above two plans.

6.11.2.11.6 Review the results in order to determine if the expected behavior is appropriate. If the behavior is inappropriate either:

6.11.2.11.6.1 Drop the activity as an expectation.

6.11.2.11.6.2 Identify another person who is capable of performing the activity.

6.11.2.11.6.3 Change the activity so that it is in line

with the individual's present knowledge, capability and skill.

6.11.2.11.6.4 Identify a prerequisite activity which when established will remedy the deficiency.

6.11.2.11.7 Make any necessary changes in the chronological list.

6.11.2.12 Review each activity in light of the resources that are needed to carry it out.

6.11.2.12.1 Select the method of identification.

6.11.2.12.1.1 Directly observe the person performing the activity.

6.11.2.12.1.2 Ask yourself.

6.11.2.12.1.3 Ask others.

6.11.2.12.1.4 Ask the person who is involved in the activity.

6.11.2.12.1.5 Directly observe others performing the activity.

6.11.2.12.1.6 Directly observe the products of others who have performed the activity.

6.11.2.12.1.7 Read literature.

6.11.2.12.1.8 Some combination of the above.

6.11.2.12.1.9 Any other appropriate method of identification.

6.11.2.12.2 Using the selected method of identification answer the following questions.

6.11.2.12.2.1 What would the who require to carry out the activity?

6.11.2.12.2.2 If the who had failed to carry out the activity what would be missing?

6.11.2.12.2.3 If the who were actually carrying out the activity what would they be missing?

6.11.2.12.2.4 What unusual things could be used by the who to carry out the activity?

6.11.2.12.2.5 What things have nothing to do with the who carrying out the activity?

6.11.2.12.2.6 Combine the above lists into one list.

6.11.2.12.3 Test the above list for completeness.

6.11.2.12.3.1 The methodologist and/or decision maker develops and implements appropriate tests of completeness.

6.11.2.12.3.2 Use another mode of identification.

6.11.2.12.3.3 Answer the above questions for similar activities.

6.11.2.12.3.4 Answer the above questions for completely unrelated activities.

6.11.2.12.4 Choose the most appropriate and the most critical prerequisite resources.

6.11.2.12.5 Review the chosen list of resources to determine if they will be available at the time the activity is called for. If there is any doubt that these critical prerequisite resources will be available add to the chronological list of activities other activities which are designed to acquire the needed resources.

6.11.2.13 Identify appropriate consequences which are to follow the successful completion of each activity.

6.11.2.13.1 Determine whether or not consequences are needed by answering the following questions:

6.11.2.13.1.1 Is the activity already highly desirable to the person involved?

6.11.2.13.1.2 Is the person already performing the activity frequently?

6.11.2.13.1.3 If your answer to either of the above questions is yes, then consequences are not needed. If your answer is no then proceed through the rest of this step until an appropriate consequence is identified.

6.11.2.13.2 Choose the most appropriate type of consequence.

6.11.2.13.2.1 Success and simple

movement to the next activity.

6.11.2.13.2.2 Social interactions (Talking to others, praise, constructive criticism from supervisor or peers, being touched or hugged, etc.)

6.11.2.13.2.3 Activities. (Taking or teaching courses, independent study programs, playing tennis, etc.)

6.11.2.13.2.4 Tokens (money, points, chips, etc.)

6.11.2.13.2.5 Others not listed.

6.11.2.13.3 If success is chosen then the activity should be recycled through 6.11.2.5 & 6.11.2.11 and 6.11.2.12 until the chance of failure has been eliminated.

6.11.2.13.4 If any other type of consequence has been chosen then the following steps should be performed.

6.11.2.13.4.1 Select the method of identifying

alternative consequences category (6.11.2.12.1)

6.11.2.13.4.2 Develop an exhaustive list of alternative consequences within the chosen consequence categories.

6.11.2.13.4.3 Choose the most appropriate consequence using the following criteria:

- Effectiveness in
- maintaining the activity (desirability to the person involved).
- Cost.
- Consequences on the environment (disruption or unsettling effects on yourself and others).
- Any other appropriate criteria.

6.11.2.13.5 Determine if there are activities to acquire/develop and administer the chosen consequence. If there are none develop them and add them to the chronological list of activities.

6.12 Recycle to 6.8 and repeat the last five steps until all elements have activities designed for their implementation.

6.13 Integrate the activities for implementing each element into a single chronological list of activities for implementing the solution as a whole.

6.14 Review this single list of activities to make sure that the list is complete, that the list contains anchoring activities, and that there is logical flow from one activity to another. Any new activity as developed in this step or in the previous step should also be reviewed.

6.15 Confirm this list of activities with any individuals or groups that the decision maker may choose on the basis of law, policy or personal preference.

6.16 Provide for feedback.

6.16.1 Select the activities on which feedback data is to be provided. These activities will represent the points at which the solution will be reviewed.

6.16.1.1 Simple method: Have the decision maker select those activities that he/she believes are most

important with respect to the solution accomplishing its purpose.

6.16.1.2 Complex method: Have the decision maker select those activities that he/she believes are most important with respect to the accomplishment of the most critical components of the solution's purpose.

6.16.2 Have others perform either the simple or the complex version of the above step.

6.16.3 Make any changes in your list of activities that you believe are necessary given the results of the previous step.

6.16.4 Prioritize the selected activities. The activities may be prioritized on the basis of such criteria as:

6.16.4.1 Importance in accomplishing the solution's purpose.

6.16.4.2 Importance in accomplishing the most critical components of the solution's purpose.

6.16.4.3 Amount of resources used by the activity.

6.16.4.4 Sequencing.

6.16.4.5 Difficulty.

6.16.4.6 Possibility of failure.

6.16.4.7 Consequence of failure.

6.16.5 Have others repeat the previous step.

6.16.6 Make any changes in your original prioritization that you believe are necessary given the results of the previous step.

6.16.7 Allocate the resources available for providing feedback among the activities according to their priorities.

6.16.8 Choose the earlier activity for which a feedback mechanism has not been developed.

6.16.9 Divide the resources available for providing feedback on that activity among the following tasks: designing the feedback mechanism; implementing the feedback mechanism;and reviewing the results of feedback.

6.16.10 Determine the actual date on which the decision maker would like to be provided feedback data on the chosen activity. The earliest date would be immediately after the activity is implemented. The actual date should be as close as possible to the earliest date.

6.16.11 Have the decision maker review all solution activities that are to be implemented prior to this date to determine if he/she would like to receive feedback data on any activities other than the chosen one. Ideally the decision maker should be provided with feedback data on each of the solution's activities. If additional activities are to be observed the decision maker should recycle to step 6.16.1 and repeat as many of the last ten steps as possible. The decision maker should then proceed to step 6.16.12.

6.16.12 Use the following procedures to develop a feedback mechanism for the chosen activity.

6.16.12.1 State the purpose of the activity.

6.16.12.2 Clarify the purpose if it is not already stated clearly.

6.16.12.3 Develop an observational technique for measuring the degree to which the activity accomplishes its purpose.

6.16.12.4 Plan the implementation of the observational technique.

6.16.12.5 Confirm the observational technique and the plan for its implementation with the decision maker.

6.16.13 Recycle to step 6.16.8 until a feedback mechanism has been developed for each activity that the decision maker wants observed prior to the first review point. During the meeting held at the review point the decision maker should plan on performing the following activities; review the activities that have already been implemented; make any necessary corrections in the solution; review the activities to be implemented prior to the next review point; plan or review the feedback activities to be implemented by the methodologist prior to the next review point.

6.16.14 If resources and desire permit recycle to step 6.16.8 and repeat the previous steps for as many of the remaining review points as possible.

6.16.15 Integrate all feedback procedures into a single list of activities. This list will serve as a description of the methodologist's role during the implementation of the solution or a particular piece of the solution.

6.16.16 The methodologist should review this list against such criteria as clarity, completeness, practicality and coherence.

6.16.17 Confirm this list with the decision maker.

6.16.18 Discuss with the decision maker the options for using feedback data.

6.17 Test the feedback mechanism and/or the solution itself. Make any changes in the solution or in the feedback mechanism that you believe are necessary given the results of testing.

6.18 Allocate the resources for implementing the solution to the solution's activities.

6.19 Evaluate the effectiveness of this major process.

6.19.1 Repeat step 3.7 for this major process.

6.20 Cycle to step 1.6.7.

7.0 Implement the solution.

7.1 Plan the implementation of this major process.

7.1.1 Repeat step 3.1 for this major process.

7.2 The methodologist should proceed to step 7.3, while the decision maker should proceed to step 7.4.

7.3 The methodologist implements the feedback mechanism.

7.3.1 Identify the first/next point at which you are to

supply the decision maker with feedback data.

7.3.2 Review all feedback activities that you are to carry out in order to provide the necessary data.

7.3.3 Confirm with the decision maker the exact date at which you are to provide him/her with feedback data.

7.3.4 Confirm the feedback activities with the decision maker.

7.3.5 Implement the feedback activities.

7.3.6 Compile the feedback data.

7.3.7 Plan for reporting the feedback data to the decision maker. The feedback report should include such items as the activities on which feedback data was gathered, the data gathered on each activity, and the resources used by each activity. Provisions should be made for examining each of the activities with the decision maker. This will entail developing a preliminary allocation of the time that the decision maker has for reviewing the activities among the activities themselves. This allocation may be changed by the decision maker at the beginning of the meeting or as the meeting progresses.

7.3.8 Cycle to 7.5.1

7.4 The decision maker implements the solution.

7.4.1 Identify the first/next point at which you are to meet with the methodologist for the purpose of

reviewing that part of the solution that has been implemented to date.

7.4.2 Identify the first/next activity that you are to implement prior to your meeting with the methodologist.

7.4.3 Review this activity.

7.4.4 Implement or supervise the implementation of this activity.

7.4.5 Gather any data available on the activity's effectiveness, problems encountered, and resources used. Personal intuitions regarding the effectiveness of the activity are important data sources and should not be overlooked.

7.4.6 Recycle to 7.4.2 and repeat the last four steps until all the activities that can be carried out prior to your meeting with the methodologist have been carried out.

7.4.7 Cycle to step 7.5.1

7.5 The methodologist and the decision maker review that portion of the solution that has already been implemented and make any changes that the decision maker believes are necessary.

7.5.1 The methodologist and the decision maker meet at the prearranged time.

7.5.2 The methodologist explains to the decision maker the scope of the meeting. This explanation should include a brief description of the activities to be reviewed and the amount of time that can be devoted

to reviewing them as a whole. The decision maker will then determine how much time should be devoted to each activity. This determination is flexible and may change as the meeting proceeds. In most cases some time should be allocated to the review of each activity.

7.5.3 The methodologist chooses the first activity to be reviewed according to the activities sequence of implementation.

7.5.4 Identify the criteria by which the activity will be judged successful.

7.5.5 Identify the resources that had been originally allocated to the activity.

7.5.6 The methodologist presents the decision maker with any data that have been gathered on that activity.

7.5.7 The decision maker identifies any observations that he/she may have made or which others may have communicated to the decision maker regarding the effectiveness of the activity.

7.5.8 Using all the data that have been gathered, the decision maker should answer the following questions:

7.5.8.1 Was the activity successfully implemented?

7.5.8.2 Is the activity critical to the solution accomplishing its purpose?

7.5.8.3 How much resources has the activity actually used?

7.5.8.4 How do the resources used compare to the resources originally allocated? Has the activity used more or less resources than was originally planned? If so identify how much. If the decision maker believes that the difference in resources is so slight as to be insignificant it need not be recorded.

7.5.9 If the activity was both critical and unsuccessfully implemented perform one of the following activities and then implement the rest of step 7.5. For all other activities proceed to 7.5.13.

7.5.9.1 Plan to reimplement the activity.

7.5.9.2 Design a new activity to be implemented in place of the unsuccessful activity.

7.5.10 Determine the amount of resources required by the option that you choose in step 7.5.9.

7.5.11 If the original activity had used more resources than had been allocated to it, add that amount of resources to the amount of resources that you identified in step 7.5.10.

7.5.12 If the original activity used less resources than had been allocated to it subtract the excess from the amount of resources that you identified in step 7.5.10.

7.5.13 Make any needed resource adjustments.

7.5.13.1 If the resources consumed by the original activity are greater than the resources

initially allocated to it, or if additional resources are needed to correct a critical activity that was unsuccessfully implemented perform any one or combination of the following activities:

7.5.13.1.1 Adjust the resources that are allocated to the remaining activities so as to "free up" the needed resources.

7.5.13.1.2 Acquire additional resources.

7.5.13.1.3 Delete some of the planned activities so as to "free up" the needed resources.

7.5.13.2 If the resources consumed by the original activity are less than the resources originally allocated to it, perform any one or combination of the following activities:

7.5.13.2.1 Reallocate the saved resources among the remaining activities.

7.5.13.2.2 Develop additional activities that could use the saved resources.

7.4.13.2.3 Allocate the saved resources to some other problem area.

7.5.14 Recycle back to 7.5.3 until either the resources for this step have run out or until that section of the solution that should be reviewed at this point has been reviewed

and any needed changes have been made.

7.6 The decision maker and the methodologist review that portion of the solution that is to be implemented prior to the next review point. If feedback activities have already been planned then the methodologist should implement all eleven substeps of this step. However if feedback activities have not been planned the methodologist should cycle to step 6.16 and plan the necessary feedback activities and then implement the first seven substeps of this step.

7.6.1 Identify the activities that are to be implemented prior to the next review point.

7.6.2 Prioritize these activities with respect to their importance in the solution's accomplishing of its purpose.

7.6.3 If necessary and desirable allocate the resources that are available for reviewing these activities among the activities themselves according to their priorities.

7.6.4 Choose the highest priority activity.

7.6.5 Review the chosen activity.

7.6.6 Make any changes in that activity that the decision maker believes are necessary.

7.6.7 Recycle back to step 7.5.4 and repeat the previous steps for as many of the activities as possible.

7.6.8 The methodologist presents the decision maker with any feedback activities that the methodologist is to implement prior to the next review point.

7.6.9 The decision maker reviews these feedback activities.

7.6.10 The methodologist makes any changes in the planned feedback activities that he and the decision maker agree to be necessary.

7.6.11 If necessary the methodologist should review with the decision maker the options for using the feedback data.

7.7 The methodologist recycles to 7.3 and the decision maker recycles to 7.4. Both carry out their respective responsibilities until the solution has been fully implemented, the problem solved, or the resources for implementing the solution have run out.

7.8 Evaluate the effectiveness of this major process.

7.8.1 Repeat step 3.7 for this major process.

7.9 Recycle to step 1.6.7

8.0 Evaluate.

8.1 Plan the implementation of this major process.

8.1.1 Repeat step 3.1 for this major process.

8.2 Make a list of the components of the decision maker's purpose.

8.3 Have the decision maker prioritize the components of the purpose.

8.4 Allocate the evaluation resources among the components according to their priorities.

8.5 Have the decision maker confirm the allocation and make any adjustments that he/she believes are necessary.

8.6 Choose the highest priority component that has not yet been examined.

8.7 Determine if the chosen component has been accomplished.

8.7.1 Compile the results of implementing those solution activities that are related to the accomplishment of that component.

8.7.2 Ask the decision maker to decide if this data indicates to him/her whether or not the component has been accomplished. If the decision maker cannot make this determination then the decision maker should proceed to step 8.7.3. However if the decision maker can make this determination he/she should record whether or not the component has been accomplished and then proceed to step 8.8.

8.7.3 Design and implement an observational technique for measuring the accomplishment of the component.

8.7.4 Repeat step 8.7.2 using this new data.

8.8 Repeat the previous steps until each component of the decision maker's purpose has been examined or until the resources for implementing these steps have been consumed.

8.9 Present the results of 8.5 - 8.7 to the temporary decision maker to determine if a reapplication of the methodology is desired or called for.

8.10 If the degree of efficiency, focus or completeness is unsatisfactory determine the cause.

8.10.1 The solution was poorly implemented.

8.10.2 The solution (activities and/or plan for decision making) was poorly developed.

8.10.3 The major parts of the actual solution were poorly designed.

8.10.4 The ideal solution was incorrectly conceptualized.

8.10.5 The purpose was poorly stated.

8.10.6 The needs analysis was inadequate.

8.10.7 The preparation for the utilization of the methodology was inadequate in:

8.10.7.1 Planning the application of the methodology.

8.10.7.2 Negotiating the contract.

8.10.7.3 Preparing the methodologist.

8.10.7.4 Disseminating the methodology.

8.10.7.5 Developing a current version of the methodology.

8.10.7.6 Identifying the reader's frame of reference.

8.11 If warranted reapply the methodology making the changes indicated in 8.10.

8.12 Evaluate.

8.12.1 Repeat step 3.7 for this major process.

8.13 Recycle to 1.6.7.

Process For Selecting a Surrogate Decision Maker

1. Explain the nature of the surrogate role to the decision maker.

2. Have the decision maker make an initial selection of a surrogate using one of the following two methods:

   2.1 Simple method:

      2.1.1 Have the decision maker identify other individuals or groups that he/she believes would respond to the methodology's procedures in exactly the same way as the decision maker would.

      2.1.2 If more than one potential surrogate has been identified have the decision maker choose the one that he/she believes will respond with the greatest similarity.

   2.2 Complex method:

      2.2.1 Have the decision maker identify his/her values.

      2.2.2 Have the decision maker choose the most critical of his/her values.

      2.2.3 Have the decision maker identify those who hold the same values.

      2.2.4 If more than one potential surrogate has been identified have the decision maker choose the one that he/she believes holds the value the strongest.

3. Determine the probability of the surrogate performing the surrogate role effectively.

   3.1 Have the decision maker answer the following questions with respect to the surrogate.

3.1.1 Will the surrogate be comfortable with the surrogate role? If the decision maker believes that the surrogate will be very uncomfortable with the surrogate role then the decision maker should recycle to 2. and choose another surrogate.

3.1.2 Will the surrogate be able to devote to the methodology an amount of resources equivalent to the amount that the decision maker has planned on devoting to the remaining appropriate sections of the methodology? If the decision maker believes that the surrogate will be unable to devote an equivalent amount of resources then the decision maker should recycle to 2. and choose another surrogate.

3.1.3 Will the surrogate be comfortable with the methodology? If the decision maker believes that the surrogate will be very uncomfortable with the methodology then the decision maker should recycle to 2. and choose another surrogate.

3.2 Determine the probability of the surrogate performing his/her role successfully.

3.2.1 Select some step of the methodology that has already been performed by the decision maker.

3.2.2 Arrange a meeting with the surrogate.

3.2.3 Meet with the surrogate and perform the following tasks:

3.2.3.1 Explain the methodology and determine the surrogate's degree of commitment to it. If the

surrogate appears to be uncommitted inform the decision maker and select a new surrogate.

3.2.3.2 Explain the role of the surrogate to the surrogate and determine the degree of commitment to it. If the surrogate appears to be uncommitted inform the decision maker and select a new surrogate.

3.2.3.3 Explain the amount of resources required of the surrogate. If the surrogate is unable or unwilling to devote this amount of resources inform the decision maker and select a new surrogate.

3.2.3.4 Have the surrogate perform the chosen step of the methodology.

3.2.3.5 Present the results to the decision maker asking him/her to determine the degree of similarity.

3.2.3.6 Ask the decision maker to determine if there is enough similarity to warrant transference.

3.2.3.7 If the decision maker is absolutely sure that the surrogate will respond to the methodology's procedures in the same way that the decision maker would, proceed to the next step. If not, either

3.2.3.7.1 Have the surrogate perform additional steps of the methodology and perform the last three steps for the results obtained.

3.2.3.7.2 Recycle to 2. and identify other surrogates.

4. Collect the information necessary for the surrogate to perform the surrogate role.

   4.1 Using any one of the following methods determine the information that the surrogate needs.

      4.1.1 Ask the decision maker.

      4.1.2 Ask the surrogate.

      4.1.3 Ask others who may have worked with the decision maker on the problem to date.

   4.2 Gather the necessary information.

   4.3 Determine with the decision maker the points at which the work of the surrogate is to be reviewed.

   4.4 If the resources permit review with the decision maker the options that are open to the decision maker should problems arise with the surrogate.

5. Provide the surrogate with the information.

   5.1 Present the information gathered in 4.2 offering to answer any questions that the surrogate might have.

   5.2 Explain to the surrogate the points at which the decision maker will review the work of the surrogate.

6. Develop a plan for interacting with the surrogate in terms of time.

7. Confirm the plan with the decision maker and the contract decision maker.

8. Implement the plan.